Railway August 1945 Mechanical Engineer



COMPANY OF

AUG 2 3 1945

Cast Steel

GRANES

FRANKES

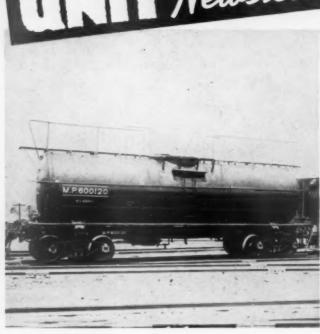
THE WINE BAILWAY APPLIANCE CO.

TOLEDO . OMO

UNIT Newsletter

UNIT TRUCK CORPORATION

140 Cedar Street New York 6, N. Y.

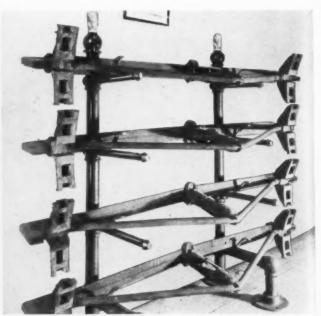




Here's the story behind our June 2nd advertisement in RAILWAY AGE. Back in July 1938 the first Unit Truck application was installed on Missouri Pacific Auxiliary Water Car M. P. 600120. We knew Unit Brake Beams were good for at least half a million miles—so we kept our fingers crossed and wished M. P. 600120 bon voyage.

In April 1945 Missouri Pacific notified us—"Unit Brake Beams on M. P. 600120 after 605,817 miles of service show practically no wear on brake heads and wear-plates." This was it! This was the proof of every claim we had ever made for Unit! That's why we felt mighty good when we okayed that June 2nd copy.





Now—in offices, business cars, clubs, wherever and whenever busy "brass hats" talk shop—they're talking about Unit. Users of the 29,999 Unit car sets now in service feel mighty good about it, for old M. P. 600120 has justified both our claims for Unit and their faith in us. The others say—"Sounds good, but that's a lot of miles. We'll believe it when we see it!"

That's why M. P. 600120's original Unit Brake Beams now occupy the place of honor in our permanent exhibit in New York. Next time you're in town drop around and we'll make you welcome. Actually seeing the evidence of this sensational performance will surely convince you. Meanwhile—we're wondering just who is going to buy that thirty thousandth Unit Truck.

In the solution tank of your

Automatic Coach-Washing Equipment

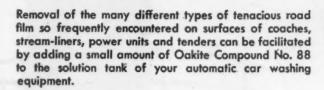
Use Safe

Oakite Compound

No. 88

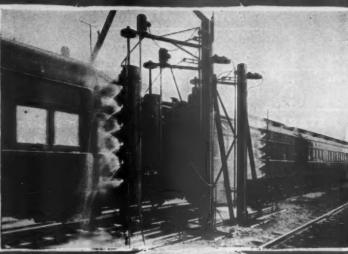
CLEANING

xtra dirty coaches!



Oakite Coach-Washing Materials Safe to Surfaces . . . Economical

Sprayed on surfaces, solutions of Oakite Compound No. 88 quickly act on stubborn road film and importantly contribute to the effectiveness of the mechanical brushing and rinsing operations. If you have already installed or plan to install automatic car washing equipment to SAVE time and REDUCE coach-washing costs, the men of our Railway Service Division will be glad to make tests of Oakite car-washing materials and give you the benefit of their wide experience on this work. Inquiries invited and promptly answered.





TOP PHOTO: Shows Blackhall automatic car-washing equipment, manufactured by Ross and White Co.

BOTTOM PHOTO: Shows Whiting automatic coach-washing equipment, manufactured by Whiting Corporation.

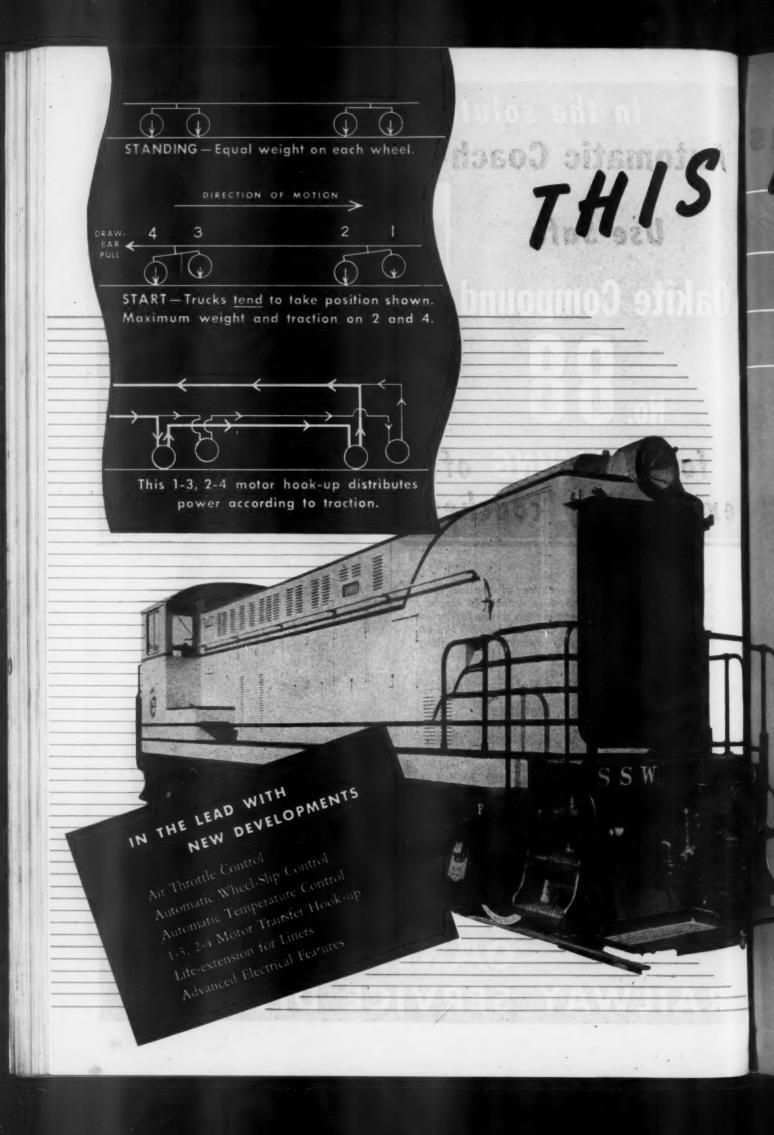
Both types of equipment make provision for spraying coaches, streamlined power units, etc., with a cleaning solution preliminary to brushing and rinsing operations. Various Oakite materials are available for adding to cleaning solution tanks.

OAKITE PRODUCTS, INC., WRIGLEY BUILDING, CHICAGO II, ILL.

In Canada: OAKITE PRODUCTS OF CANADA, LTD.

TORONTO: 65 Front St. East-MONTREAL: 1 Van Horne Ave.

OAKITE RAILWAY SERVICE DIVISION



1.3-2.4

MOTOR HOOK-UP

improves starting characteristics of

Baldwin-Westinghouse Diesel Electrics

One of the biggest advantages of Baldwin-Westinghouse Diesel-Electric Locomotives is the tremendous draw-bar pull they can deliver in starting. This feature comes directly from a novel and ingenious motor hook-up.

Motors 1 and 3 are connected in series across the line, as are motors 2 and 4. When starting power is applied, the trucks start to move forward against the opposing pull of the draw-bar. Due to the lever-arm, the trucks toud to rise in the front, reducing the load on the leading wheels of each truck, and so increasing the load on the trailing wheels.

Any increase in the speed of the leading wheels immediately increases the countervoltage of the driving motors, and reduces the current. Because of the generator characteristics, this reduction in current causes a rise in voltage, which increases current flow to the trailing wheels. Any tendency of these wheels to slip is overcome by the anti-slip device... another exclusive feature.

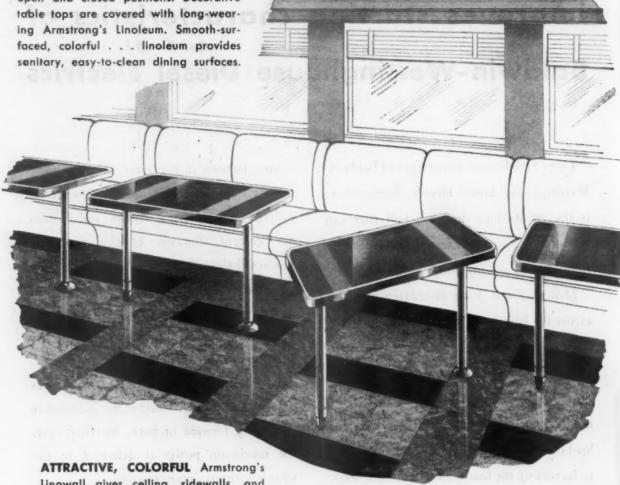
It will be noted that this action takes place automatically, whether the locomotive is moving forward or back. In either case, the maximum power is delivered to the wheels with maximum traction.



ADVANCE STYLE NOTES FOR POST-WAR PASSENGER CARS



PIVOT TABLES simplify passenger seating in quick service grill car . . . lock in open and closed positions. Decorative table tops are covered with long-wearing Armstrong's Linoleum. Smooth-sur-



Linowall gives ceiling, sidewalls, and panels a smart, modern gaiety that adds to dining pleasure. Linowall's durable, lustrous finish facilitates cleaning. Dirt and stains are quickly and easily removed with damp cloth.

DURABLE Armstrong's Linotile (Oil-Bonded) is an exceptionally wear-resistant flooring. Two-tone marbleized pattern complements car's decorative scheme. Armstrong's Cork Base underlayment saves weight, resists indentation. Can be used over Keystone, Chanarch, or any other type of floor plate.

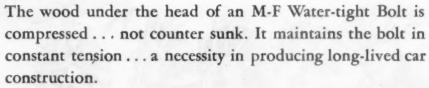
ARMSTRONG'S versatile floor and surfacing materials combine durability and beauty. They will help you create long-lasting post-war interiors that are smart and modern in design and color. For full information and free samples of Armstrong's Linoleum, Linowall, and Linotile, write Armstrong Cork Co.,

Industrial Div., 7408 Arch Street, Lancaster, Pa.

ARMSTRONG'S FLOORS and SURFACING MATERIALS for passenger cars

Note how the "M-F" Water-tight Bolt compresses fibers and creates tension.

BOLT M-F'WATER-TIGHT BOLT TENSION Lengthens car life Lengthens car life



The M-F Water-tight Bolt presents visual evidence that it is properly applied... evidence that is not readily available with other applications.

To obtain the proper tension, the head of the Watertight Bolt must be pulled down until it is flush with the surrounding surface.

You can always tell when an M-F Water-tight Bolt is under tension . . . the head is flush with the surface surrounding.

"M-F" Lock Nuts... Water-tight Bolts... Locktight Floor Clips... Collar Bolts. Small items, but their proper application insures long-lived cars.

MACLEAN-FOGG LOCK NUT COMPANY

649 N. Kildare Avenue, Chicago 39, Illinois • In Canada: The Holden Co., Ltd., Montreal

A Complete Metal Cutting System FOR RAILWAY SHOPS

"O K" means a system . . . a variety of inserted-blade metal-cutting tools wide enough to meet the major needs of any railway shop. Milling, reaming, turning, planing can all be speeded up and usually improved by the consistent use of these modern tools. At present, O K Tools are sold only under war regulations, but peace is now definitely in sight, so here's a peace-time suggestion; (1) outfit an entire department with the O K System; or (2) sample its efficiency by "peaking up" some one run of work with certain specially selected O K Tools. Actual experience will then demonstrate why they are so highly favored in railroad shops.

In O K Milling Cutters and Single-Point Tools, the blades or bits are separate cutting units, the bodies are of drop-forged alloy steel. In the milling cutters, and in the single-point tools, the blades or bits are held in mating serrations or in other secure locking devices - always easily adjustable in line of wear, simple to renew. Made in a wide variety of styles and sizes for all types of metal cutting



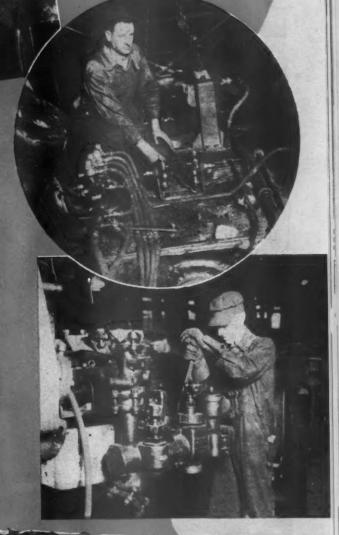


ATHAN LUBRICATION 70 213 Points...

THE type 2-8-8-2 compound mallets (Class Y6) on the Norfolk and Western are excellent examples of modern and efficient locomotive lubrication. These heavy freight engines are equipped with four NATHAN DV-7 Mechanical Lubricators and 46 NATHAN Distributors which deliver dependable lubrication to 213 points on the locomotive. These include a thoroughly effective job of chassis lubrication, and the lubrication of such important parts as valves and cylinders, shoes and wedges, truck pedestals, spring hangers, equalizer pins, valve gear parts, crossheads and guides, stoker tender bearings and many other parts. Complete NATHAN lubrication, not only improves locomotive performance and reduces maintenance, but speeds up the turning of locomotives at terminals, because it takes so much less time to check the NATHAN Lubrication System than it would take to do the actual lubrication.

It is of interest also to know that these locomotives are equipped with NATHAN high pressure non-lifting injectors for safety and economy. NATHAN'S 80 years of service to the railroads is your assurance of satisfactory performance. NATHAN engineers are always at your service.

K" ERY



NATHAN MANUFACTURING CO., NEW YORK 17, N. Y.

Established 1864

Triple-duty 44-TONNER



- 3. Four heavy-duty traction motors, self-ventilated with clean air drawn from above the locomotive platform. Motors are axlemounted and cushioned from shock by spring-nose support.
- 4. Simple control, connecting two motors permanently in parallel to each generator.
- 5. Full battery charging at all speeds—total 3.5 kw.
- 6. Differential split-pole exciters, with simple magnetic circuits, which require no adjustment and hold the generator horsepower output constant throughout the normal speed range of the locomotive.





AMERICAN LOCOMOTIVE

ca

re

PROVES ITS VERSATILITY

on 3. Santa Fe jobs

HETHER it's switching, yard service, light road work—or any combination of the three—this 380-hp, 44-ton diesel-electric locomotive is capable of doing an outstanding job and producing annual net savings that are often 20 to 30 per cent of its cost.

Here's how three units, on three different operations of the Santa Fe, are reducing motive-power requirements through their versatility and ability to work on 24-hour daily schedules:

YARD SWITCHING

• Three eight-hour tricks a day in the Topeka yards are the regular assignments of this 44-tonner. It easily handles trains of 20 loaded cars and uses an average of four gallons of fuel oil an hour—costing about 24 cents, compared with an average fuel cost of 60 cents an hour for steam locomotives doing comparable work.

TRANSFER WORK

• In addition to its regular assignment of switching at the Fresno passenger station, this diesel-electric takes a 35-car freight train every day from the Calwa, Cal., yard three miles to Fresno. There, it breaks up the train, delivers the cars to industrial sidings, and then returns to Calwa with another train.

STATION SWITCHING

• "Y-ing" Santa Fe crack streamliners, such as the "San Diegan", is only one of the close-schedule jobs that this 44-ton unit handles at San Diego; it does the industrial switching and shop work as well. During three recent months, its availability for work averaged more than 98 per cent.

Low in first cost and low in maintenance cost, the 44-ton diesel-electric has proved to be a good investment even for one-shift-per-day operation—an even better investment when you work it more hours.



Powered	£	Daile	and Was	L D.	:14 40	Lack
Powered	TOT	MC CHARLE	and wen	FR PL 11	HIT TO	LOST

		TITAILING TONS										
Speed, Mph	Tractive Effort, Lbs	Level	0.5% Grade	1.0% Grade	1.5% Grade	2.0% Grade						
3	17,500	2016	902	570	411	317						
7.5	12,300	1405	622	388	276	210						
10	9,650	1091	478	285	206	154						
15	6,600	734	313	188	128	92						
20	4,750	516	213	123	79	54						
25	3,750	398	159	88	54	33						
30	3,050	315	121	63	35	19						
35	2,350	233	83	39	17							

Resistance is based on 8.5 pounds per ton.

Its utilization can be just as high as its average availability—95 per cent—because it has the versatility to take care of the entire motive-power requirements on light-traffic parts of your system.

We'd like to discuss the application of this dieselelectric with you, and work with your organization on a motive-power survey to determine the savings it can effect on your road.

121-30-9680

and GENERAL ELECTRIC

PRILING AN

Important

Important

PRODUCTION

Need

Suffice

HEAVY DUTY Motor Spindle DRILLS

If your schedules call for accurate, heavy-duty drilling or tapping . . .

and plenty of it in a hurry . . . "Buffalo" Motor-Spindle Drills are just the rugged expediters to keep operations moving! Despite their size, they are easy to operate and quick to change for varying set-ups. Full data in Bulletin 3285-A, on request.



BUFFALO FORGE COMPANY

174 Mortimer Street

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

• 2 SIZES — 1" AND 1½"

CAPACITY IN CAST IRON

• WITH OR WITHOUT

BACK GEARING, POWER

VERSE FOR TAPPING

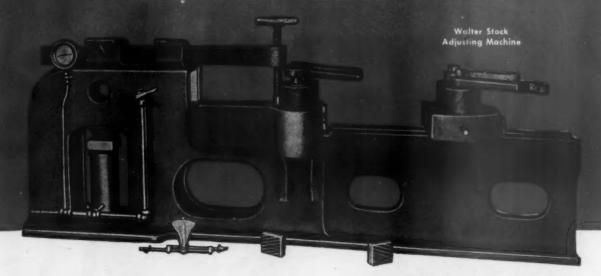
• AVAILABLE IN FROM

ONE TO SIX SPINDLES

Buffalo

Motor-Spindle
DRILLS

THIS ONE MACHINE Does 36 Hand Jobs



With this Walter Stock Adjusting Machine you can do mechanically all the customary heavy and costly hand repairs required to keep various parts of the running and valve-motion gear of locomotives operating efficiently. You can do these jobs more quickly, reduce shop costs, and shorten the length of time locomotives are out of service.

Also, the most important forge shop job—adjusting pedestal binders—can be done on this machine so accurately that the binder requires no fitting or machining.

The Watson-Stillman Co., Roselle, New Jersey.



Bulletin No. 540-A is one of a new series of bulletins describing W-S railroad shop equipment. It gives full details on the construction of the Walter Stock Adjuster, specifications, and operation of the Adjusting Gauge. It also contains a description of upsetting, lengthening and straightening operations on draw bars. eccentric rods, guides, main rods, valve rods, and similar work. Write for YOUR copy of this Bulletin, No. 540-A, and others on W-S railroad shop equipment.

FACTORY AND MAIN OFFICE ROSELLE, NEW JERSEY

BRANCH OFFICES

WASHINGTON, D. C. PHILADELPHIA, PA. NEW HAVEN, CONN. CHICAGO, ILL.

WATSON-STILLMAN

HYDRAULIC MACHINERY DIVISION

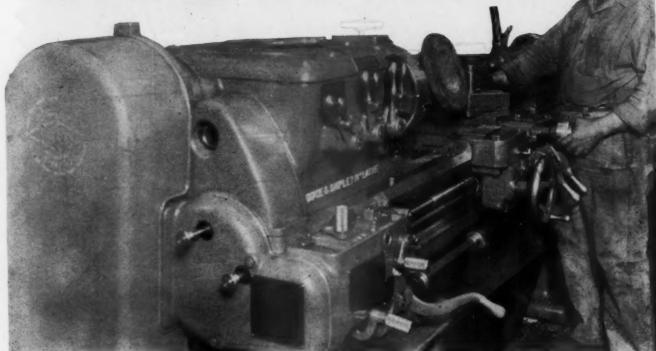
REPRESENTATIVES

WASHINGTON, D. C. Ralph Payne (R. R. Equip.)
INDIANAPOLIS, IND. . W. K. Millholland Machinery Co.
CHICAGO, ILL. . . . E. L. Essley Machinery Co.
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CANADA: Canadian Fairbanks-Morse Co., Ltd. • Branches in All Principal Cities

L&S Lathes



WORK FOR ALL R. R. DEPARTMENTS

OCOMOTIVE back shops are frequently called upon to handle repairs of equipment for all departments of the railroad.

Above illustration shows a New 16" LODGE & SHIPLEY LATHE machining a flange connection for a power house steam pump - one of those rush jobs that have to be turned out before they arrive in the shop.

The operation consisted of beveling the broken joint to facilitate welding repairs — in a few moments the job was finished and turned over to the welders. L & S Lathes ranging from 12" to 27" will be found in many railroad shops turning out locomotive parts, jobs for the Maintenance-of-way Department and other miscellaneous equipment. Precision, simple controls and fast production are the outstanding reasons for the selection of L & S Lathes in the railroad industry.

CINCINNATI. 25. OHIO. U.S.A.

ENGINEERING MANAGEMENT PURCHASING PRODUCTION TIME STUDY AND COSTS FIRST with Engineering because SPEED NUTS

FIRST with Engineering because SPEED NUTS simplify design problems and are either available, or can be produced to meet any assembly requirements.

FIRST with Management because SPEED NUTS are time-tested, vibration-proof fasteners that improve the quality, and prolong the life of the finished product.

FIRST with Purchasing because SPEED NUTS lower inventory costs, reduce stocking problems, and are DELIVERED on time. Production and service facilities are unlimited.

FIRST with Production because SPEED NUTS eliminate extra handling of production parts, are applied faster and easier, and compensate for a wider range of commercial tolerances. FIRST with Time Study and Cost because SPEED NUTS slash total net assembly costs to a fraction of other assembly methods.

Investigation will prove that SPEED NUTS should be YOUR first choice, too. Write for information today.

NOTHING LOCKS LIKE A SPEED NUT

TWO distinct forces are exerted on the screw, as a SPEED NUT is tightened.

First, a compensating thread lock, as the two arched prongs move inward to lock against the root of the screw thread. These free-acting prongs compensate for screw thread tolerance variations.

Second, a self-energizing spring lock, created by the compression of the arch in both the prongs and base. The combined forces of the thread lock and spring lock definitely prevent vibration loosening

TINNERMAN PRODUCTS, INC. . 2029 Fulton Road, Cleveland 13, Ohio





SPECIFICALLY designed for welding carbon-molybdenum steels, in all positions, this new G-E electrode can also be used successfully on other low-alloy, high-tensile materials. W-56 is the first electrode to meet all of the requirements of AWS Classification E7010/E7011. And it makes possible, for the first time, the use of either a-c or d-c for all of these applications. Even more important, the recognized advantages of the a-c welding process are now made available to industry for high-quality welding of low-alloy, high-tensile steels in the vertical and overhead positions.

Type W-56 Welds Exceed Specifications

Heavily covered, Type W-56 provides a steady, spray-type, deep-penetrating arc which produces a weld of superior quality and excellent appearance. Its light, friable slag is readily removable and sets up rapidly, facilitating welding in the vertical and overhead positions.

Although Type W-56 is designed for use in all positions, its superior welding qualities are most noticeable when it is used in the vertical. The bead obtained is relatively flat, with smooth uniform ripples. X-rays of plates welded in the vertical position are exceptionally clean, and the mechanical properties of specimens are well above specification requirements.

Test Type W-56 Yourself

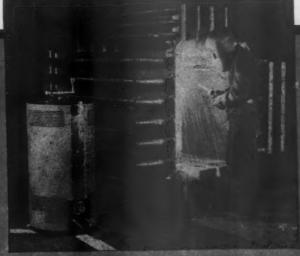
If your welding work includes the fabrication of pressure vessels (fittings), pressure piping, or other applications involving the welding of low-alloy, high-tensile steel, try the new Type W-56 electrode. Ask your G-E arc-welding distributor for samples and see for yourself the increased welding production and superior welds obtainable with this newly developed rod. Your distributor can also provide you with detailed performance data. Or, write General Electric Company, Schenectady 5, N. Y.

GENERAL & ELECTRIC

THE FIRST E7010/E7011 ELECTRODE FOR WELDING LOW-ALLOY, HIGH-TENSILE STEELS



This single-pass fillet, made in the vertical position, illustrates the deep penetration and excellent fusion obtained with Torse W. M.



Of carbon maly their, this transformer radiator assembly being worked in the vertical position is typical of the applications for which Type W-56 was designed. Either a-c, as in the illustration, or reversible the control work.

RANGE OF MECHANICAL PROPERTIES

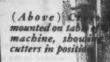


ARC WELDING
ELECTRODES
AND
EQUIPMENT

	(Stress Relieved)									
1/0	Alterna	ting Current	D-c Rave	D-c Reverse Polarity						
1/8-in. Diameter Tensile Yield Elongation % 2 in Reduction % 5/32-in. Diameter Tensile Yield Elongation % 2 in Reduction % 3/16-in. Diameter	76,000 60,000 26.0 67.0 70,700 54,500 28.0 69.0	78,000 62,000 28.0 73.4 72,500 57,500 29.0 67.0	73,000 56,000 27,0 62.5 73,000 59,500 26.0 67,0	73,000 58,000 28.0 71.4 71,000 57,500 25.0						
Yield Blongation % 2 in Reduction %	75,500 61,200 32.0 68.0	76,500 62,500 30.0 67.0	72,000 58,000 28.0 64.5	73,500 57,000 29.0 67.0						

Buy all the BONDS you can —and keep all you buy

G.&L.



No. 340-T G. & L. Horizontal Boring, Drilling and Milling Machine.

(Above) Gang milling cutters in actual operation.



150 DOTY STREET









Right: G. & L. Floor Type Machine.



cross Head Machining Imme

Locomotive Repaired and Back on the Road in 4 Hours
...this job is typical of many type repairs handled on versatile
HORIZONTAL BORING MACHINE

Now more than ever before, railroads must repair their locomotives and have them back on their runs with the least possible delay. Here is an excellent example of how a No. 340-T G. & L. Horizontal Boring, Drilling and Milling Machine is used in a large western railroad shop to reduce locomotive down time.

On this repair job the cross heads were removed, the bearing metal poured and multiple ledge slots were milled with a gang cutter. Actual machining required but 30 to 35 minutes as compared to a former machining time of eight hours. The cross heads were then replaced and the locomotive was on the road again in four hours.

1200 Cross Heads in One Month

Performance of the G. & L. machine has been so successful on this operation that it was used

to turn out 1200 completely machined cross heads in one month and, in addition, was used to ream the tapers and bore and ream the pin holes.

Replace Single Purpose Machines

In those railroad repair shops where it is impractical to have highly specialized single purpose machines to mill shoes and wedges, bore cylinders, bore roller bearing axle housings, mill, bore and channel rods, and similar other operations, the G. & L. Horizontal Boring, Drilling and Milling Machine with accessories and attachments can do such railroad machining work. Our engineers will be glad to assist you in solving urgent machining problems. They will show you how G. & L. machines are being successfully used in many other railroad shops.

wow.	7	
MAIL NOW	FOR NEW	CHINING GUIDE
	RAILROAD N	ACHINING GUIDE
*	INE TO	The state of the s

Giddings & Lewis Machine Tool Co. 150 Doty Street Fond du Lac, Wisconsin

Gentlemen: Please send me your Pree bulletin of modern machining methods in railroad shops to speed up production and repairs.

Name.....Title.....

Company....

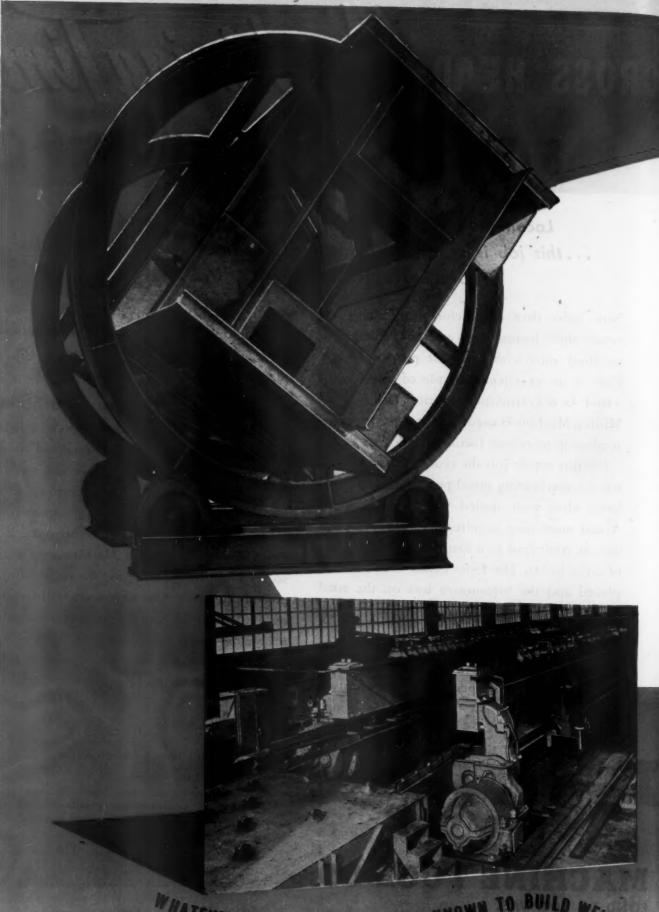
Address

City.....State.....

Left: G. & L. Planer Type Machine

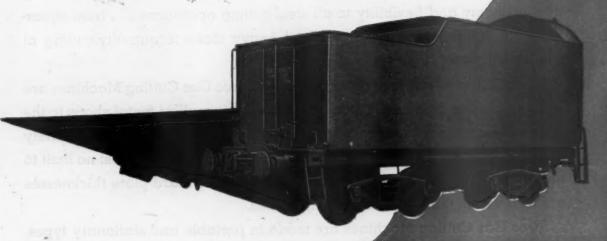


Left: G. & L. Multiple Head Type Machine



WHATEVER QCE BUILDS - IT IS KNOWN TO BUILD WELL!

In Building this All-Welded Tender, Too, the Know-How kept pace with the Need!



Built by Q.C.f. for use abroad, this locametive tender is part of a train which supplies power for devastated areas. While the eye can detect an occasional rivet or bolt — the tender is for all practical purposes, a 100 per cent welded product.

The need was great and the time was short — so to speed these tenders to completion. Q.C.f. at its Milton plant developed the rotating POSITIONER which brings all parts to be welded easily accessible for downhand welding.

Positioner, Figs. a giant double-plate planer which in one operation cuts plates from 48 to 163 inches wide to the amazing maximum tolerance of 0.0002 inch—all are tools indicative of 0.00. E's will and skill to make superior rolling stock—to make it faster—to make it last longer!

Q.C.f.

AMERICAN CAR AND FOUNDRY COMPANY
NEW YORK - CHICAGO - ST. LOUIS - CLEVELAND - WASHINGTON

Here's the fast, modern method of cutting steel to any shape, practically any size, and in most any quantity. These speedy, metal-cutting tools bring new economy and flexibility to all steel-cutting operations . . . from squaring and shaping of large plates and heavy slabs to quantity-cutting of small steel parts.

Made in a wide range of types and sizes, Airco Gas Cutting Machines are designed to meet the needs of industry from the smallest metal shops to the largest steel fabrication plants. Each Airco machine performs a wide variety of cutting jobs within its specific operating range. There is almost no limit to the thickness of steel which may be cut, and all standard plate thicknesses are well within the range of Airco machines.

Airco Gas Cutting Machines are made in portable and stationary types, designed for single and multiple torch operation. Their rugged construction and excellent operating characteristics give them long, trouble-free life, even under heavy service loads.

Call or write your local Airco office today for free copies of descriptive booklets on Airco Gas Cutting Machines or, if you prefer, address your request to Dept. RM Air Reduction, General Offices: 60 East 42nd St., New York 17, N. Y. In Texas, Magnolia Airco Gas Products Co., General Offices: Houston 1, Texas.



ego and did offices IN ALL PRINCIPAL CITIES

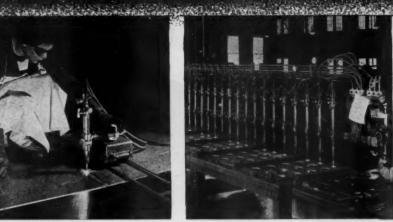


cutting methods with

AIRCO GAS CUTTING MACHINES A TYPE AND SIZE FOR EVERY CUTTING NEED



Squaring, beveling and many similar cutting jobs are performed swiftly and accurately by the Airco No. 10 Radiagraph. Lightweight and portable, this little motor-driven machine also cuts arcs and circles up to 85" in diameter.



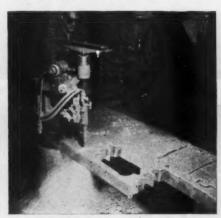
Large-area cutting and quantity production of small parts is speeded by the Airco No. 41 Travograph, a motor-driven machine which moves on a track located alongside the work. Multiple cutting torches are guided by a tracing device which follows a cam or template of the required shape.



Stack cutting small parts with the Airco Planograph. Identical parts of any design are accurately shaped in one operation by ing" the plates to any thickness within range of the cutting torch.



Pipe cutting and beveling simultaneously with the portable Airco No. 1 Pipe Cutting and Beveling Machine. This handy machine requires no power. It is operated by a crank which revolves the machine around the pipe. If desired, the machine may be held stationary while the pipe is revolved.

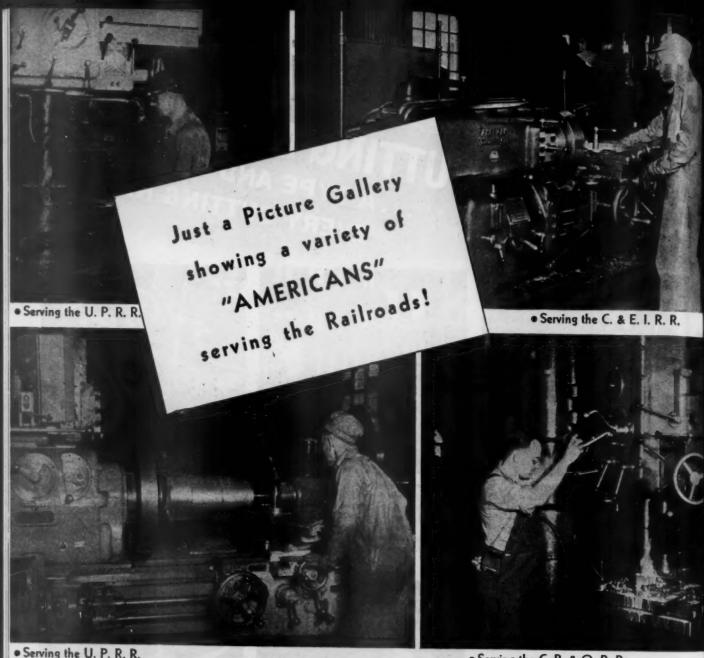


For fast cutting of small shapes the Airco No. 5 Camograph is ideal. It cuts parts of any contour by means of a motor-driven template roller which follows a metal template of the required shape. This in turn controls movement of the torch, and assures speedy, accurate



Continuous, curved bevel cuts and special symmetrical shapes are made with the Airco No. 10 Polygraph, a motor-driven machine that travels on a track which is also the template for the cut. The Polygraph is one of many Airco machines designed for special cutting operations.

of Illower

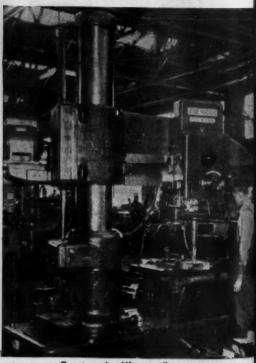


· Serving the U. P. R. R.



· Serving the B. & M. R. R.

· Serving the C. B. & Q. R. R.



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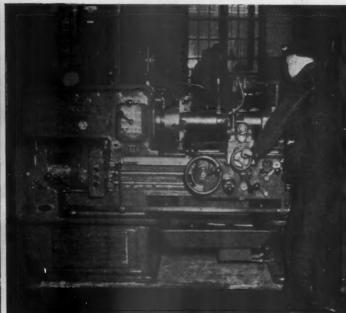
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GRIND IT ACC



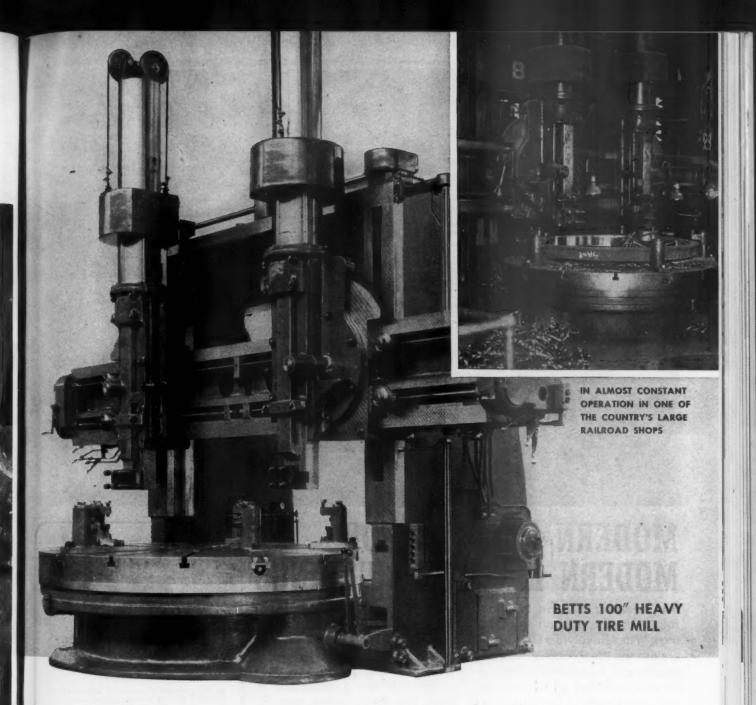
In railway construction and maintenance, Thor Rotary Air Grinders make tough jobs easier. Out on the section, or in the shops, Thor Grinders assure top-speed precision production. There's a size, model and speed for every job. Fast, easy handling cuts manhours to a minimum. Thor's advanced construction features-work-tested for 50 years-guarantee peak efficiency, maximum power and extra stamina. Leading railroads specify Thor Tools. Write for Catalog 52-B.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. Jackson Boulevard, Chicago 6, Illinois



PNEUMATIC UNIVERSAL ELECTRIC HIGH FREQUENCY ELECTRIC



WHERE SAFETY AND SERVICE DEPEND ON ACCURACY

Machines that bore locomotive tires must be thoroughly dependable . . . not alone for accuracy, but for fast, economical production as well. That is one of the reasons why Betts Tire Mills are employed for this exacting work. With them, tires are quickly centered by means of the Universal

chuck. Specially designed, quick acting tire clamps hold the work securely in place for accurate machining. Anti-friction bearing table mounting further insures this machine's high standard of accuracy. Its adjustable crossrail provides capacity for other locomotive shop work.

BETTS . BETTS-BRIDGEFORD . NEWTON . COLBURN . HILLES & JONES . MODERN



CONSOLIDATED MACHINE TOOL CORPORATION

ROCHESTER 10, NEW YORK



MODERN HEATING FOR MODERN RAILWAY BUILDINGS

For heating engine houses, round houses, and other buildings, Wing Revolving Unit Heaters are the ideal form of heating equipment, because the heated air is distributed so thoroughly that every part of the building, including far corners, maintenance pits and other hard-to-heat portions of the working space are thoroughly and comfortably

warmed. Located overhead and delivering the heated air down to the working level through slowly revolving discharge outlets, Wing Revolving Heaters bring to the workers a sensation of fresh, live, invigorating warmth. And in Summer, with the steam turned off, the cooling, refreshing effect is likewise conducive to comfort.

Write for a copy of Bulletin HR-4

L. J. Wing Mfg. Co., 52 Seventh Ave., N. Y. 11, N. Y.

Factories: Newark, N. J. and Montreal, Canada

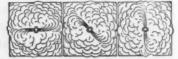


THE DISCHARGE OUTLETS

REVOLVE!

In this patented construction, uniform distribution of heat is accomplished because the moving streams of heated air sweep slowly around through 360 degrees, covering successively every direction. Thus every part of the building is kept at a comfortable temperature.

TOP VIEW





The test of CHARACTER

TO THOSE WHO KNOW THEM, Clark Gears and Forgings possess vital technical "talking points"—their carefully planned metallurgical "breeding;" their closely controlled grain structure for toughness and stamina; their sound designs engineered by long practical experience; all are conspicuous qualities long since proved by the patient Test of Use.

For those not yet acquainted with these products, there's a good and safe pre-test, the Test of Character-a quick, trustworthy guide to thorough satisfaction: the simple fact that these products are built by the Men of Clark.



FORK TRUCKS AND INDUSTRIAL TRACTORS

GEARS AND FORGINGS

STREET RAILWAY CAR TRUCKS



One piece, forged, heat treated AXLE HOUSING



ELECTRIC STEEL CASTINGS



for Trucks, Busses, Tractors



CELFOR HIGH-SPEED DRILLS AND REAMERS



POWER BOOSTER for 11/2-ton Trucks



BLIND RIVETING PROCESS



METAL SPOKE-TYPE WHEELS for Trucks, Busses, Trailers



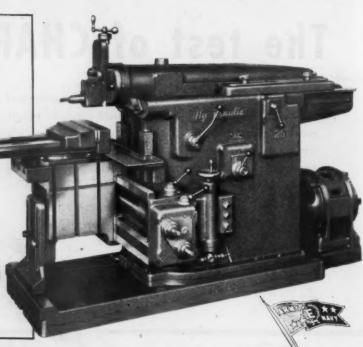
AXLES—front and rear for Trucks. Busses, Tractors



EASY-ROLL TRAILER AXLE

EQUIPMENT COMPANY CLARK RAILWAY DIVISION - - - BATTLE CREEK, MICHIGAN Hy-Draulic SHAPERS-

Save Work
Speed Production





The Rockford Hy-Draulic Shaper shown at left, is one of a pair that had been operating continuously for more than three years when this picture was taken. Tool and die work, production and maintenance jobs in great variety come to these shapers steadily. In all of this work Hy-Draulic Shaper features and advantages lighten the load on operators while speeding production in many ways. For example, length of ram-stroke, and its position relative to the work-piece, are established quickly by simple manual adjustment of two dogs-no tools are required, no cranking, there's hardly a pause in machine operation. Power rapid traverses in all directions speed set-up and production. Hydraulic ram-drive and hydraulic feeds, adjustable to any rate whatever in specified ranges, make it easy for operators to get the exact combination of cutting speed and feed that is best for each job. Many other features in Hy-Draulic Shapers promote easy profitable operation and long life. Investigate these machines. Write today, for the name of our nearest representative, and ask for Bulletin 1922.

ROCKFORD MACHINE TOOL CO., ROCKFORD, ILLINOIS

















LNEW MEKAY

MILD STEEL ELECTRODES

To an already unusually complete line McKay has added two new mild steel, shielded-arc welding electrodes with characteristics suited to modern welding needs. With these additions, the McKay researched line now offers a wider range of standard mild steel electrodes than ever before!

From this variety it is possible to select a "stock" rod that will fill most any specific need, without delay or premium cost for specials.

OTHER McKAY MILD STEEL ELECTRODES

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GENERAL SALES OFFICES: YORK, PA.



PITTSBURGH, PA.

WELDING ELECTRODES . . . COMMERCIAL CHAINS . . . TIRE CHAINS

LUCAS QUICK SET-UPS

plus
ACCURACY
and HIGH
PRODUCTION



NOTHING but a LUCAS Type Horizontal Boring Machine could handle the machining of the 12 cylinder V-type Diesel engine crankcase shown above. In this midwestern shop, a 4½" spindle LUCAS Horizontal Boring Machine, with extra length bed to take 13 feet between faceplate and outer support, is shown reboring built up cylinder head wells and lower cylinder liner seats in a 12

cylinder V-type Diesel engine crankcase. With this big crankcase, easily set up on end, accurate machining is assured by means of the spindle head indexed vertically on the column for accurate center distance between bores. For reboring the main bearings, the crankcase is mounted on the same LUCAS with an Auxiliary Table supporting the end overhanging the side of the main table.

LUCAS MACHINE TOOL CO.

10 NEW-96 BETTER

MILLERPAX

journal box packing waste

The new, better, Millerpax is designed to eliminate waste grabs, waste wipes and rolling of the packing in high-speed train service. Several years of research contributed the qualities that make Millerpax superior to ordinary packing.

Production of Millerpax is actually three processes in one —

First, all grit, metal, wood, paper, etc., are thoroughly removed from the threads

Then, the threads are subjected to an air-wash which effectively eliminates short ends and lint.

Finally, the threads are interwoven to produce an almost endless mass as is shown in the illustration at the right.

Millerpax is especially advantageous for use in passenger car, freight car and locomotive journal boxes. It is available in either all wool, all cotton, or any combination of the two packings. The thoroughness and care used in producing Millerpax has achieved outstanding results for it on one of the large railroads that has been using Millerpax for more than a year.

If your railroad wants journal box packing that will contribute to better railroad operation, specify MILLERPAX!

MILLERPAX -- Registration applied for Manufacturing Process--Patent Pending

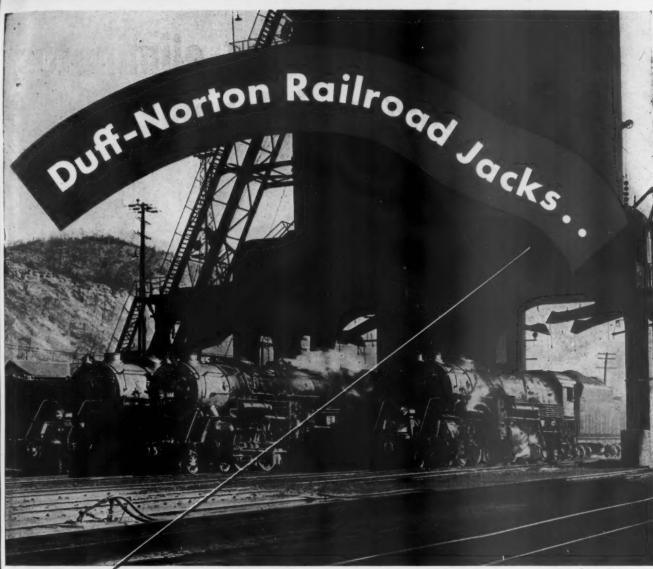


MILLER WASTE MILLS, INC.

WINONA, MINNESOTA

NASH-FINCH CO., Minneapolis - Exclusive Railroad Sales Representative





Norfolk & Western Ry.

Help speed Locomotive Maintenance

Whether it's inspecting brasses or lifting the heaviest engines, there are husky, sturdy, powerful Duff-Norton Jacks to furnish the "muscles" for the job. Be sure your men always have the right jack for the right job at the right time.

Your nearest Duff-Norton representative will be glad to survey your Jack requirements—without obligation. Let him help you keep your wartime Jack stock up to essential requirements—with fast, easy-to-handle Duff-Norton Jacks. Descriptive catalog on request.

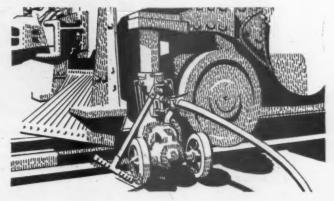
The Duff-Norton Manufacturing Co.

Canadian Plant:

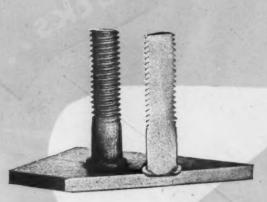
Representatives in Principal Cities

Duff-Norton Air Motor Jacks

Five types and sizes of Rotary Air Motor Operated Power Jacks are available for locomotive or car work, in capacities from 20 to 100 tons. Typical of their performance: In a comparison made by a mid-west railroad, under normal operating conditions, pitting manually-operated jacks against Duff-Norton Air Motor Jacks, the Air Motor Jacks saved seven-eighths of the labor cost and one-third of the time.



Nelson Stud Welding eliminates stud drilling and tapping!



Cutaway view of endwelded stud shows how stud is completely fused with metal in 1/2 second.



Photographs by courtesy of Herbert H. Davis Co., Cicero, 111.

weld



Welding studs through template produces accurate duplication of parts. Studs are welded through guiding template to work underneath. The operator loads a stud into the gun chuck, inserts it into the hole and pulls the trigger. Welds are automatically made in an instant.

The Nelson Arc Stud Welder saves time and material because it secures studs without drilling and tapping holes. The manufacturing of air-conditioning equipment and industrial furnaces at the H. H. Davis Co. is a fine example of a typical industrial application.

The welds made with Nelson studs result in uniform work with complete fusion between stud and metal. Thousands are now being used by more than 650 industrial plants and ship-yards. Operators can average 500 to 1000 stud welds in eight hours.

Nelson Stud Welders are fully automatic and are completely portable... they may be operated as a production unit or as a portable hand tool.





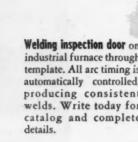
A template is used in welding stude to parts. Stude are welded through holes onto casing, insuring accuracy of spacing. Nelson Production Stud Welding Units, welders mounted on pneumatic cylinders and arbors, are also used where continuous production of parts is required.

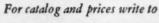


Welding inspection covers of all types is an ideal stud application. Studs are welded at desired centers to cover flange and cover secured with nuts. No holes in casing . . . close tolerances held.



Inspection plates of all kinds are welded in any position with the portable Nelson welder. Light in weight and easy to handle, it may be used efficiently in any location. Welds produced are as strong as any hand-welding method have consistent weld fillets.





NELSON SPECIALTY WELDING EQUIPMENT CORP.

Dept. R. 440 Peralta Ave., San Leandro, Calif.

Eastern Representative: Camden Stud Welding Corp. Dept. 122, 1416 So. Sixth St., Camden, N. J.



You Have Been Waiting

BULLARD

MAN-AU-TROL

OF THE MACHINE

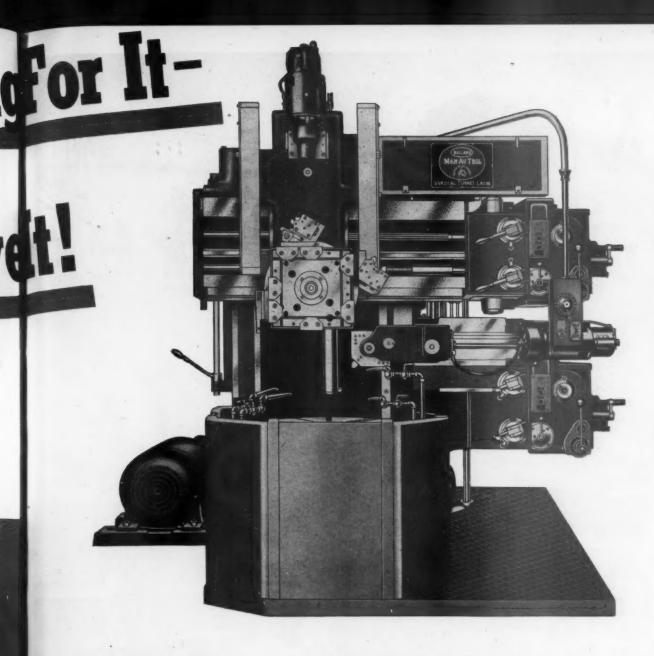
WARREN

OF THE MACHINE

We Have

The Cut Master V.T.L. has made a big hit in a number of large shops. It possesses many features which offer unusual savings in production costs. These features include greater power, higher speeds, greater variety of feeds, more cutting heads, simplified controls, automatic stops and many other new developments. This unit can be obtained with the new MAN-AU-TROL. Do not specify a boring mill until you have made a thorough investigation of the latest BULLARD developments.





The Automatic Control that is as Versatile as Manual Control

TOMORROW'S industrial problems have been the chief concern of BULLARD Engineers. This is an old BULLARD progressive policy which well known by all railroad shop supervisors.

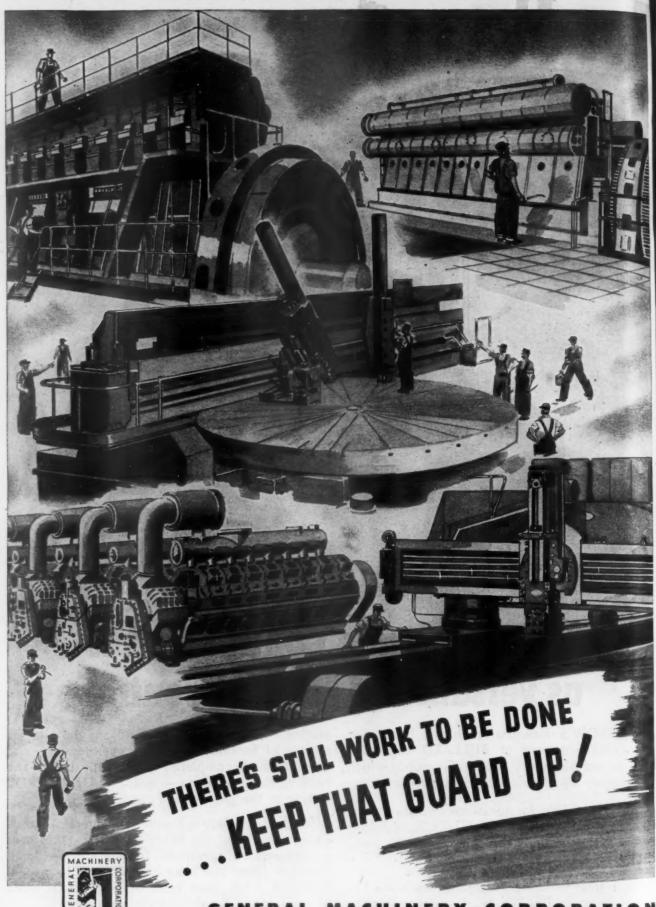
Today you can plan for tomorrow's requirements—the new BULLARD MAN-AU-TROL V.T.L.—the new automatic unit that you have been waiting for.

t differs from ordinary automatic machines because of its versatifity — manual or automatic operation. It is not committed to any definite sequence of functions until the operator runs one piece through completely — manually brings the tools through each cut — and a MAN-AU-TROL setting at the end of each cut.

After the first piece is finished the operator moves a single lever and the MAN-AU-TROL takes over — performs all operations automatically — doing the work faster and more accurately than manual operation. You have been waiting for it! We have it! Send for detailed information.

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT



GENERAL MACHINERY CORPORATION

THE NILES TOOL WORKS COMPANY . THE HOOVEN, OWENS, RENTSCHLER CO. . GENERAL MACHINERY ORDNANCE CORPORATION

CHIPPER SAVES \$1050.00 CHIPPER SAVES \$1050.00 Ly using AND AND PRESSURE

90

Look what happens to the C. E. (cutting efficiency) of a hammer when the air pressure at the tool drops below 90 pounds:

90 psi ... 100% 80 psi ... 83½% 70 psi ... 63% 60 psi ... 50%

Let us assume that a chipping hammer operator earns \$2100.00 a year. If he is permitted to use a hammer that is only 50% efficient, the loss will be \$1050.00. For a plant using only 20 chipcient, the loss will be \$1050.00 amount to more than \$20,000 pers, the excess labor costs would amount to more than \$20,000 a year. Ingersoll-Rand "Cutting Efficiency Service" will help a year. Ingersoll-Rand "Cutting Efficiency Service" that is

you save these dollars.

Air pressure is but one of the important factors that is

Air pressure is but one of the important factors in
checked by our "Cutting Efficiency Service." Other factors in
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Ingersoll-Rand



The evaluation of work actually done by a chipping hammer

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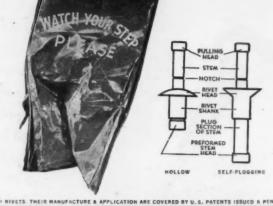
maintenance and repairs, as well as initial manufacture.

They are upset with a pulling action by small, easy-tohandle Cherry Rivet guns, can be installed by one workman from one side of any location, blind or not, without buckingwork with speed and ease in all sheet metals, in soft or brittle materials, in any blind, cramped or hard-to-get-at spot. Cherry Rivets have broad tolerances in material thickness and hole size; exert an unusual clinching force. They will speed up and improve your present riveting-will rivet many jobs which you now must fasten in some less satisfactory way.

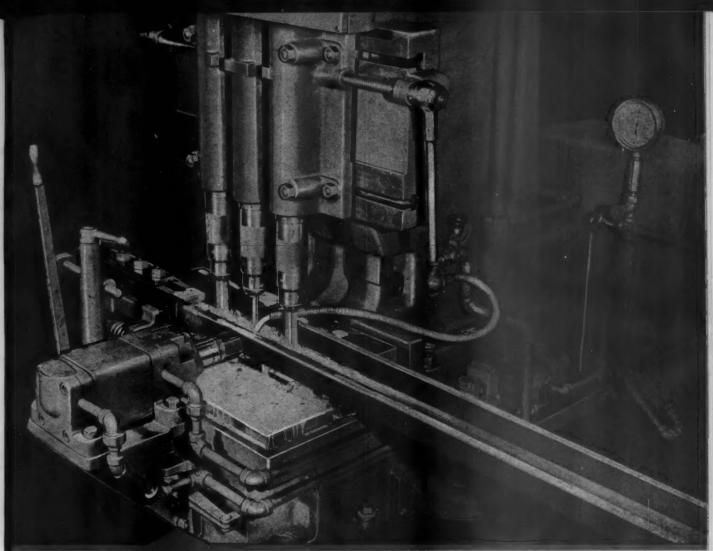
Cherry Rivets are manufactured in several types, diameters, heads, grip lengths and alloys. Installed, they have shear values comparable to solid rivets, will stand up under even the most severe vibration or strain. They are not expensive.



For a quick glance at the many uses and advantages of Cherry Rivets, write now for Manual D-45, Dept. A-277, Cherry Rivet Company, 231 Winston Street, Los Angeles 13, California.



LOS ANGELES 13, CALIFORNIA



he New SELLERS RAIL DRILLING MACHINE

Compare It With the "Old Timers!

SELLERS engineers were well acquainted with the many disadvantages of existing machines, so they started from scratch to design a drill which could cope with modern rail mill practice. The result of their efforts has been enthusiastically received wherever rail-drilling is an important operation.

SELLERS construction is simple, the parts strong and the spindles supported as close as possible to the work. Its gearing is unusually strong and mounted in oil-type casing on the top of the main housing. All gears are high grade forgings and run in oil. All shafts are mounted in anti-friction bearings... This type of drive requires no more attention than the rear axle of an automobile.

Saddle can be set to drill any thickness of rail, either automatically or hand operated... Minimum distance between spindles is 3½". Maximum, 12"... Designed also for elongated holes.

For complete technical data and delivery dates, write:

WM. SELLERS & COMPANY

1630 HAMILTON STREET . PHILADELPHIA, PENNA.



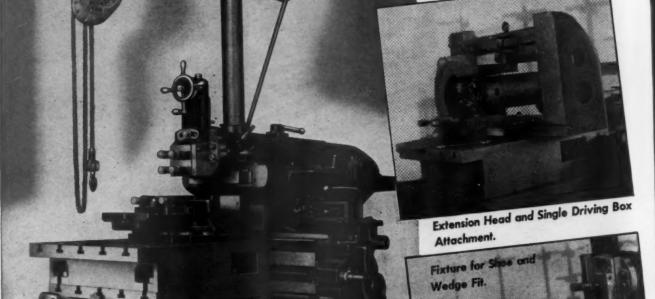
Since 1848

These and other American railways are users of Ohio Shapers: Atlantic Coast Line, A.T.& S.F., Burlington, Canadian Pacific, Central of N.J., C.& O., C.& N.W., D.& H., Erie, Frisco, Illinois Central, L.& N., Mexico National, Milwaukee, New Haven, N.Y.C., N.& W., Northern Pacific, Pennsylvania, Reading, Southern Pacific, Union Pacific, Wabash, Western Pacific.

OHIO



SUPER-DREADNAUGHT
SHAPERS



The use of Ohio Shapers for many years by the country's foremost railroads attests their power, capacity, convenience and general adaptability to such severe service. The 36" Ohio Super-Dreadnaught Shaper shown here is unusually well suited to large, troublesome, oversize jobs. Specifications: table —30" x 48"; ram bearing in column—56" x 15"; length of ram without head —80"; long ram allows 36" stroke at any position on table or if work projects beyond front of table; maximum distance from drop table (when furnished) to ram—30"; weight of standard machine—13,400 lbs.

Bulletin No. 80 gives detailed information.

THE OHIO MACHINE TOOL COMPANY
KENTON, OHIO

RAILROAD ATTACHMENTS

Complete attachments for railroad shop use are available, including patented extension head with both vertical and circular feed for driving box work, single and double chucks for driving boxes, shoe and wedge chucks in several models, shell brass attachments, main rod brass attachments, fixtures for shoe and wedge fit, transfer gauges, etc.

OHJO DREADNAUGHT
HORIZONTAL BORING, DRILLING AND MILLING MACHINES - SHAPERS - PLANERS



to RED LEAD'S Extra Rust Protection...

There is no question about Red Lead's acceptance throughout industry as the standard priming paint for making metal LAST.

One important reason is its ability to keep metal surfaces in a "passive" or rust-inhibiting state. Authorities agree that metal protective paint should be rust-inhibitive to give satisfactory performance.

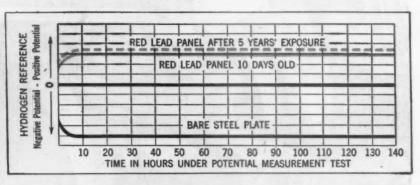
Time-potential curves, such as the one at right, are used to express rust-inhibitive properties of paint and thus indicate its effectiveness of protection. They show the effect of Red Lead on the potential of steel in the presence of moisture or water.

For example, a steel panel whose potential is positive, relative to hydrogen, is considered to be in a passive or non-corroding state. A negative potential indicates corrosion activity or rusting. The graph shows clearly the rust-inhibitive effect of Red Lead paint on steel as contrasted with the rapid and continuous rusting of unpainted steel.

Note that in this test a Red Lead paint film which had weathered 5 years was just as effective in preventing rust as one which had dried for only 10 days.

Specify RED LEAD for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better metal paint if it contains Red Lead,



*Proof That Red Lead Keeps Metal Passive

In the above test a piece of unpainted steel was immersed in water. Iron, going into solution, reacted with oxygen in the water to form rust. This unrestrained corroding state is indicated by a rapidly developed and maintained negative potential (see above graph). However, when steel panels painted with Red Lead were immersed un-

der the same conditions, ferric and lead salts formed directly next to the metal. This action at once stifled corrosion by preventing the iron from going into solution, thus keeping the steel surface passive. The result is shown in the graph curves above, where a quickly rising positive potential remains constant throughout the test.

Write for New Booklet—"Red Lead in Corrosion Resistant Paints" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas ... ranging from Red Lead—Linseed Oil paints to Red Lead—Mixed Pigment—Varnish types. If you haven't received your copy, address nearest branch listed at right,

All types of metal-protective paints are constantly being tested under all conditions at National Lead's many proving grounds. The benefit of our extensive experience with Red

Lead paints for both underwater and atmospheric use is available through our technical staff.



MATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead 60.); Pittaburgh 30 (National Lead & Oil Co. ef Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.); Charleston 25, W. Va. (Evans Lead Division).

DUTCH BOY RED LEAD

For the biggest nut-turning jobs HERE'S SUPER-POWER...

Set big nuts down solidly... with "beef", muscle and powerful leverage! Or break frozen ones loose instantly — there's performance when a Snap-on Heavy Duty Boxocket goes to work!

Performance plus safety! The boxocket opening completely encircles the nut . . . grips it on all sides . . . it cannot spread, jump or slip. The operator "lays into the job" with complete confidence in his own safety. And the compact offset Boxocket head reaches into cramped quarters inaccessible to other wrenches. The double hexagon broaching gives the advantage of a short turning arc where obstructions restrict free swinging of the wrench handle.

Snap-on Heavy Duty Offset Boxocket wrenches are available in a complete range of sizes from 1\%" to 3\%" opening, with interchangeable handles from 18" to 36" length. Write for 1945 catalog of 3,000 Snap-on hand and power tools for production, assembly and maintenance.

SNAP-ON TOOLS CORPORATION
8058-H 28th AVENUE KENOSHA, WISCONSIN



MARTIN WELLS' Stubby HOLDER

The on-off-

exort ree

hes om lles log

010-

N

Gives more ARC time

100% Insulated; Cuts Down Accidents

- Stubby, with new "Mitt-Grip" collar, makes rod changing easier and quicker. Collar lasts indefinitely. Insulator cap may be replaced without changing collar and without special tools. So, Stubby spends more time on the job, less in the repair shop.
- 2. Higher electrical conductivity, due to special construction of vise body, delivers full amperage to the rod. Sturdy, but lightweight construction protects Stubby when overloaded.
- 3. Stubby's perfect balance, due to streamlined design and light weight, helps operator maintain high weld-footage throughout the shift. Because it is 100 per cent insulated, Stubby does not have accidents.
- 4. Stubby's high pressure grip holds rods firm, enables operator to use rods down to the last 1½". Stubby has no springs to get tired.

Stubby WILL GIVE YOU MORE ARC TIME

MODEL 3R, 300 AMP. 14 OZ.

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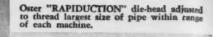
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ST LOUIS - Steel Sales Corp
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Los Angeles 1, California





Movement of cam lever on the "RAPIDUCTION" die-head sets chasers for any size pipe to be threaded. Micrometer adjustment of lever sets chasers for any depth of thread desired.

Threading speeds of Oster "RAPIDUCTION" machines range from only 11.3 seconds on 1½" pipe to only 3 minutes, 10 seconds on the big 12" pipe. Those speeds are maintained on a continuous production basis.

Three Models

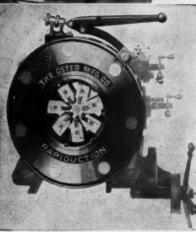
No. 6-A "RAPIDUCTION." Standard range 11/2" to 6" pipe. Bolt range 1" to 4".

No. 8 "RAPIDUCTION." Standard range 21/2" to 8" pipe.

No. 12 "RAPIDUCTION." Standard range 3½" to 12" pipe.

If you have large quantities of pipe to thread, Oster "RAPIDUCTION" machines will prove to be a profitable investment.





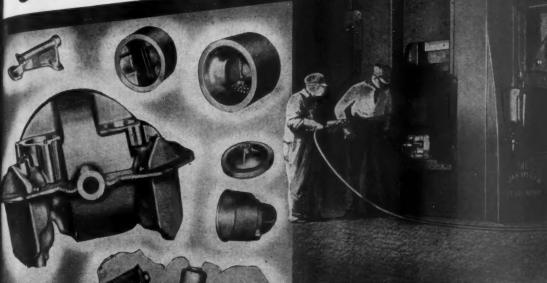
Oster "RAPIDUCTION" die-head adjusted to thread smallest size of pipe within range of each mactions.



Rapiduction"
PIPE MACHINES

THE OSTER MANUFACTURING COMPANY, 2074 EAST 61st ST., CLEVELAND 3, OHIO, U. S. A.

large ALUMINUM
PRESS FORGINGS
for Aircraft...



AJAX



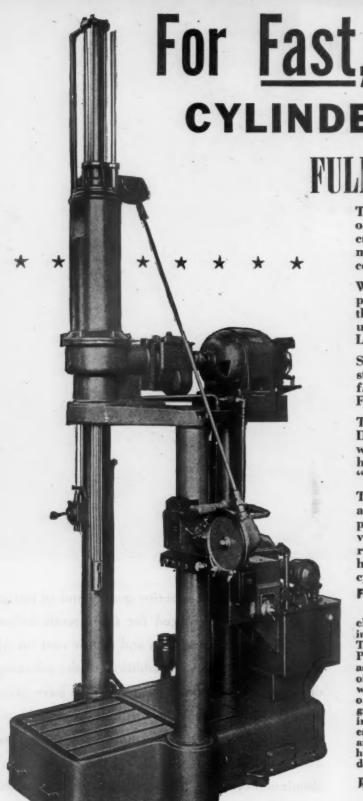
PRESS forgings of superior quality and of intricate design are being forged for the aircraft industry at high production speeds and at low cost on Ajax High Speed Presses. In addition to the advantages of speed and economy, these forgings have greater strength due to the hot forging process shaping the grain flow so that the finished forging has a denser, stronger structure. In the production of aluminum cylinder heads, pistons, strut members and a wide range of large fittings and frame construction parts, Ajax Forging Presses have proved most advantageous.

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MANUFACTURING COMPANY

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For Fast, Precision CYLINDER HONING MER HONING

> The Fulmer Honing Machine can finish Diesel or any other type of cylinders to precision ac-curacy much faster than is possible by any other means. It saves time and reduces maintenance

Wide range of spindle and reciprocating speeds permits honing small or large diameters within the range capacity of the machine, with strokes up to 72" and cylinder diameters up to 20" bore. Larger capacity on special order.

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The Fulmer patented control and "Stop and Dwell" system places all controls at "floor level" within easy reach of the operator, and permits honing open bores or up to internal shoulders or "blind" cylinders.

The Fulmer Honing Machine is the modern answer for low cost finishing of Diesel cylinders; piston valve, air pump and brake cylinders; reverse gear, stoker or other types of cylinders required in the railroad field. Remember honing assures longer operating life of both the cylinder and packing.

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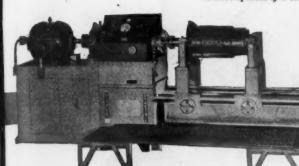
MEANS LONGER LIFE FOR RAILROAD EQUIPMENT

GISHOLT DYNETRIC

BALANCING MAC

Actual records show that reconditioned traction equipment, when properly balanced on Gisholt Dynetrics, has 2 to 3 times its original life. If you aren't taking advantage of Dynetric Balancing to keep equipment running longer and more smoothly, write us for full information.

*A development of Westingbouse Research Laboratories.



FOR THE LOCOMOTIVE REPAIR SHOP

The Gisholt Type U Dynetric Balancing Machine is used for balancing traction motor armatures, Diesel-electric generator armatures, Diesel crankshafts, and other parts weighing from 250 to 6,000 pounds.

It takes but a few minutes with a Gisholt Dynetric to assure the accurate balance that eliminates the destructive vibration that causes excessive bearing loads, unnecessary wear and shortens the life of rotating parts. Whatever the part may be, from 1/2 ounce to 50 tons, there's a Gisholt Dynetric to

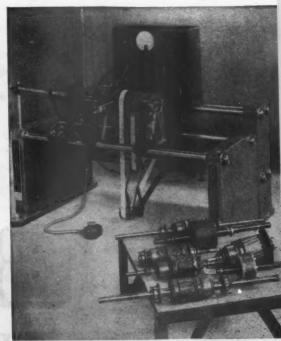
FOR THE ELECTRICAL

SHOP The Gisholt Type 3S Dynetric Balancing Machine is used for balancing auxiliary power generators, car heating, air-conditioning and ventilating equipment, and for any other rotating parts weighing from 15 to 300 pounds.

All auxiliary equipment is balanced by the original manufacturers. But it should be rebalanced when it is reconditioned to insure maximum life with the smoothest possible operation.

Gisholt Dynetric Balancing Machines are simple to operate, provide accurate static and dynamic balance more quickly and accurately than any other known means. Gisholt Balancing Machines soon pay for themselves in the longer life and reduced maintenance costs on many types of railroad equipment.

For complete information as to how Gisholt Dynetrics are being used in railroad shops, write us.



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handle it.



nozzle tester

IT doesn't take an expert to operate the BUDA Nozzle Tester. Any mechanic can quickly locate hidden troubles with this portable precision instrument and restore Diesels to peak efficiency.

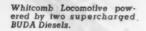
The BUDA Universal Diesel Nozzle

Tester is a complete unit for checking all popular models of nozzles and injectors. No outside equipment is necessary to measure injector opening pressures, test for leaky valves, sticking needle valves, dribbling nozzles, etc.

The Model B is available with either 3,000 or 5,000 lb. p.s.i. gauge and comes in a handy, all-metal carrying case, complete with attachments and operating instructions. Send for illustrated literature.

... for all popular makes of nozzles and injectors.

> Patent Pending



BUDA Model 6-DCS-1879 Diesel Engine of the type used in the above Whitcomb Locomotive.



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Typical test set-up utilizing tester and supplementary adaptors, cradle, etc.



HUCK Blind Rivets are unusually strong, safe and dependable—and economical, too, even on jobs where conventional rivet's might ordinarily be used. The "inside" story of the way they work shows the reasons behind these advantages.

- positive shank expansion At the start of the driving operation, the pneumatic rivet gun pulls tapered shoulder of pin through a smaller-diameter hole in the sleeve, positively expanding the sleeve to fill the hole. (Drawing at right shows this step approximately half completed.) This assures a rigid, fatigue-resistant joint capable of withstanding vibration and reversals of stress.
- bulbed blind head formation Next, as the pull on the pin continues, the sleeve is squeezed between the head of the pin and the outer anvil of the gun. The sleeve end upsets to form a bulbed head rather than flaring out into a tulip head. This action pulls the sheets tightly together; also provides adequate surface contact between blind head and sheet, resulting in great strength and rigidity.
- positive mechanical lock The inner anvil of the rivet gun then automatically forces the locking collar at the outer end of sleeve into the conical space shown at right, rigidly and permanently locking the pin to the sleeve. This positive lock gives the rivet a strength comparable to that of a solid rivet; also precludes all possibility of the pin working out.
 - pin break, flush with head Finally, the pin is broken off in tension substantially flush with the head of the sleeve. There is no projecting end left to be cut off in a separate operation. . . The steps here outlined all automatically follow in proper sequence, and the whole driving operation requires only an instant.

TEE ILLUSTRATED MANUAL gives full details, including complete working data. Write for Bulletin 451.

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August, 1945

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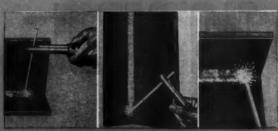


SAYS THE MAN IN THE HELMET-

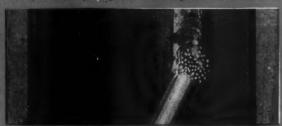
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(AWS Classification E-6013)

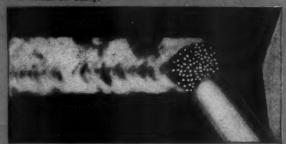
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"The arc has a forceful, spraying action which makes vertical and overhead welds easier. You can use plenty of current — either A.C. or D.C. — and the electrode won't deteriorate at the stub end.

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have them send you a free copy of Catalog No. 120. If you wish, address your request to the New York office, Dept. RME

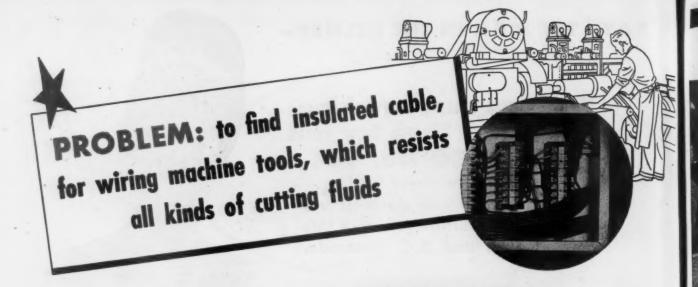


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RESISTS FLAME—Flamenol does not support combustion. Thus, it prevents serious outages due to fires that involve wiring. Requiring no protective braid, it reduces the volume of wiring and eliminates terminating problems due to fraying. Flamenol's insulation strips easily and leaves the conductor surface untarnished. It is highly resistant to oils, water, mild acids and alkalis, and weather. It is tough, stable, and flexible at low temperatures, and has high dielectric strength.

A G-E "FIRST"—Only G.E. makes Flamenol wire and cable. Flamenol is the pioneer of wire and cable insulated with plasticized polyvinyl chloride. It was produced by G.E. in 1935—not as a substitute for rubber-insulated wire, but as a new type possessing desirable properties

GENERAL ELECTRIC

Buy all the BONDS you can-and keep all you buy

not available with rubber. To find out how Flamenol can help solve your problems—save you time, trouble, and expense—ask our local office, or write General Electric Company, Schenectady 5, N. Y.
*Trade-mark reg. U.S. Pat. Off.



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Solved by MURCHEY

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Photographs by courtesy of The Timken-Detroit Axle Co

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MURCHEY



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IF you'll read "Everywhere in Industry" you'll find a number of ways to save money through reduced operating costs. This new, up-to-date 16-page booklet covers the many important developments in Hycar synthetic rubber that have been made in the last 3 years.

It specifically suggests applications in your business that can be directly translated into actual savings of money through longer product life and lower maintenance costs-in all kinds of gaskets and seals, mats and flooring,

vibration dampeners, sealing strips, and many other items.

Examine the list of properties in the box at the right, keeping in mind the requirements of your rubber parts. Then write Department P-7, for your FREE copy of "Everywhere in Industry". Or ask your supplier for parts made from Hycar for test in your own applications — difficult or routine. You'll learn for yourself that Hycar can help you reduce operating costs. Hycar Chemical Company, Akron 8, Obio.

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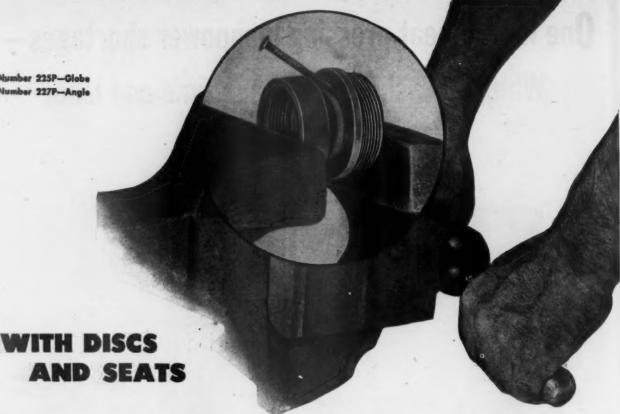
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The WALWORTH No. 225P Bronze Valve cuts maintenance costs to the bone

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Further, every other part of Walworth No. 225P has been designed and constructed to afford full protection against wear and leakage. Available in both globe and angle types (angle type No. 227P) in sizes from 1/4" to 2", this quality valve is recommended for superheated steam up to 500 F, and 1000 pounds non-shock service on cold oil, water, gas or air.

For complete data on this long-life, economical Walworth Bronze Valve see your nearby Walworth distributor, or write for Catalog No. 42. The catalog gives all information, including sizes, dimensions, specifications and list prices on this, as well as Walworth's complete line of valves and fittings.





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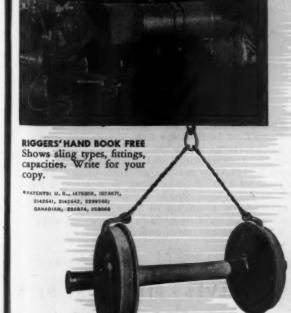




It can be a blueprint, sketch or description. Given an accurate "picture" of your lifting problem, we will suggest an efficient Yellow Strand Braided Safety Sling with these advantages: increased protection for men and loads, easy-to-manage flexibility, high kink-resistance, light weight.

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Steam-Driven Air Compressor



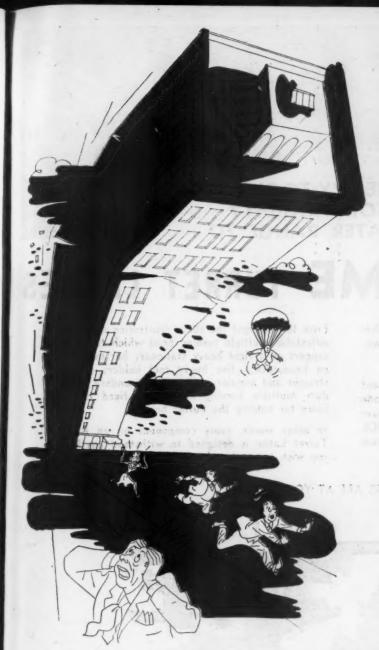
SERVICE RECOMMENDATIONS: In addition to service in air lines, illustrated above, Crane Cast Steel Wedge Gate Valves are made for steam, water, oil or gas pressures up to 2500 pounds at 1000° F. The 600-pound class, shown in cross section, with Carbon-Molybdenum body and Exelloy to No. 49 Nickel Alloy seating, are recommended for steam, water, gas or air up to 850° F. maximum; with Exelloy to Exelloy seating, for oil or oil vapor up to 1100° F. maximum, with Stellite to Stellite seating, for steam up to 1000° F. maximum. Available with screwed, flanged or welding ends in all practical sizes. See your Crane Catalog for complete specifications.

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Nor would you put carbide cutting tools on a lathe lacking the fundamental rigidity for their use. Carbide tools have increased cutting speeds from 200 to 500 per cent. They require as much as 300 per cent more horsepower.

Modern Jones & Lamson Turret Lathes are designed specifically to carry this extra load, and more. They have the rigidity, they can transmit the power, they are easy to operate.

Now is the time to check your equipment. Plan now to scrap obsolete machines and replace them with good War Surplus machines or new machines. Our engineers will be glad to assist you.

What HORSEPOWER Are You Using?

This cut, on 2-inch bar stock, requires 300 per cent more horsepower with a carbide tipped tool than with a high speed steel tool, and Carbide halves the cutting time.



Engineered to "Carry the Load" for Most Productive Operation With Carbide Jutting Tools



JONES & LAMSON

MACHINE COMPANY Springfield, Vermont, U.S.A. Manufacturer of: Universal Turner Lather . For Automotic

Madufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers.



CINCINNATI ACME TURRET LATHES

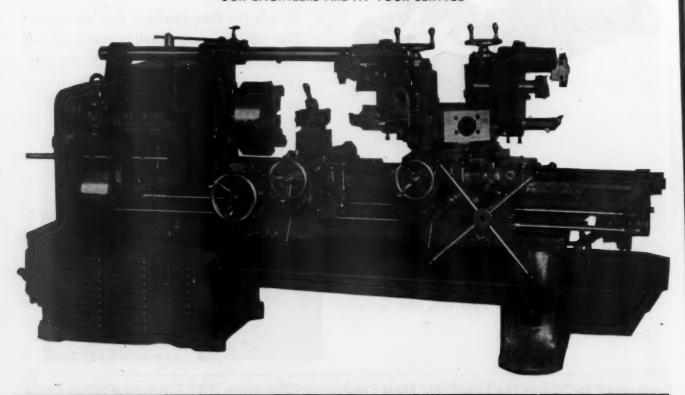
FROM bed to tool post all Acme Turret Lathes are built to provide the power, speed and precision necessary for modern requirements.

Acme engineers have also made another important contribution to the progress that is being made with cemented carbide cutting tools — they have developed a NEW LINE OF MASSIVE TOOL HEADS AND HOLDERS which assure maximum rigidity and range of performance.

From left to right the above illustration shows an adjustable multiple turning head which takes its support on a rigid heavy stationary bar mounted on headstock — five heavy tool holders of the straight and angular types and a standard heavy duty multiple turning head with fixed center holes for holding the cutter heads.

In other words, every component on an Acme Turret Lathe is designed to withstand anything you wish to machine with modern cutting tools.

OUR ENGINEERS ARE AT YOUR SERVICE



AFEME MACHINE TOOL CO. CINCINNATI, OHIO.

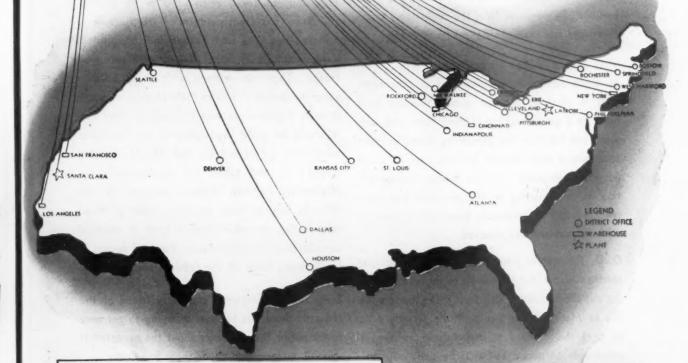
KENNAMETAL-THE ALL-AMERICAN CARBIDE

Serviced by a Nation-Wide Organization

The ingredient that distinguishes steel-cutting Kennametal from other cemented carbides (the unique intermetallic compound, WTiC₂) is an American invention, developed in 1937 by the president of Kennametal Inc. Using WTiC₂ as the key ingredient, he began making Kennametal tool blanks, of graded compositions suitable for different steel-cutting purposes, in a small plant employing twelve persons, at Latrobe, Pa.

Kennametal soon became established as the tool material that made possible machining of hard steel, accurately, at economy-promoting speeds. In eight years its use has spread, until today Kennametal Inc. has grown to such stature that it successfully serves hundreds of America's major metal-working plants.

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THE EDITOR'S DESK

WANTED -- A SQUARE DEAL!

All sorts of praise and expressions of appreciation have been heaped upon the railroads for their remarkable performance during the war. But—

Other essential industries when they needed assistance in the way of plant facilities, materials or manpower, have been relatively generously dealt with by government agencies. Not so the railroads. Not particularly favored by the draft, in spite of the essentiality of the service, they were called upon, in addition, to supply a great number of volunteers from the supervisory staffs to officer and man the Railroad Battalions.

They have also been niggardly dealt with, so far as much needed new equipment is concerned. This is strange, for the armed services have built up a great backlog of equipment and supplies, and facilities for producing them, in order to assure a wide margin to take care of every possible emergency. Vital as railroad transportation in this country is, the situation has been reversed and the railroads have had to operate with no provision for reserves.

O. D. T. Director Johnson has done his best to secure support, but with little or no avail. Pointing out the increasing demands being made upon the railroads, and in prospect, he frankly tells us that the railroad transportation problem is unsolvable on paper, but that by some supreme effort the railroads simply must make good in performing an impossible task.

All of this is surely bad enough, but faced with an impossible manpower situation on the western railroads, in particular, Assistant Secretary of War Patterson grudgingly agrees to assign a few thousand railroad men from the armed services to help out in the emergency. The public seems to have gained the impression from his words that the railroads are asking something unreasonable and are being babied—and yet, the war with Japan can be greatly prolonged if the railroads fail to deliver the required service.

On top of this the railroads are called upon to be the whipping boys. With little or no warning the Army has greatly advanced its program of bringing men back from Europe and the railroads have unexpectedly been flooded with returning troops. They are stormed with abuse because veterans cannot all ride in Pullman cars, although if every Pullman car was assigned to their use, it would be quite impossible to care for them adequately. Fortunately, the O. D. T. has stepped in and taken the responsibility for eliminating Pullman sleepers on runs of 450 miles or less, in order to assign more of these cars to the veterans. And in spite of political considerations, transportation for race horses is finally being ruled off the railways and highways.

Every railroad employee and every friend of the railroads should do his part in trying to get over to the public the real facts about the exceptional railroad performance under these handicaps.

Roy V. Wright



A BOVE illustration shows one of the many recent installations of KING BORING MILLS in railroad shops.

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RAILWAY MECHANICAL ENGINEER



II

R. G. Henley, Chairman



H. W. Jones, Vice-Chairman



V. R. Hawthorne, Executive Vice-Chairman

Mechanical Division Has

Active Year



A. C. Browning, Secretary

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General committee meets to transact necessary business, accept reports and assure maximum help for war effort



W. I. Cantley, Mechanical Engineer

Since the annual June meeting of the A. A. R. Mechanical Division could not be held this year, the General Committee met at Chicago on June 28 and 29 to transact necessary business and consider various matters associated with increased co-operation in the war effort. On June 28, the chairmen of 11 standing committees sat in with the General Committee and presented their respective reports and recommendations bearing on the more efficient maintenance and use of locomotive and car equipment.

Present officers of the Division, who will continue to function until the next regular annual meeting, include: chairman, R. G. Henley, general superintendent of motive power, Norfolk & Western; vice-chairman, H. W. Jones,

chief of motive power, Pennsylvania; executive vice-chairman, V. R. Hawthorne; secretary, A. C. Browning, and mechanical engineer, W. I. Cantley. Two new members elected to the General Committee include A. G. Kann, general superintendent of equipment, Illinois Central, in place of P. O. Christy, who held the same position on the I. C. and recently retired on account of ill health; and J. E. Goodwin, chief mechanical officer, Chicago & North Western, in place of H. H. Urbach, mechanical assistant to the executive vice-president, Chicago, Burlington & Quincy, who resigned from the General Committee on account of the pressure of other duties.

The work and responsibilities of the Mechanical Division have been greatly augmented during the war period,

but are of such a character, for the most part, as not to be reflected in committee reports which have been curtailed expediting the construction of this type of car which, and reduced to minimum requirements. Among other activities relating to matters of national defense not covered in published reports, mention may be made of the work of the Car Construction Committee in contributing to the design of emergency troop sleepers and kitchen cars. Similarly, the work of the Tank Car Committee has

been an important factor in conserving material and through intensive use, has made a major contribution to the war effort.

One of the hardest working committees of the Mechanical Division is that on Loading Rules which, through subcommittees still makes almost daily contact with ordinance plants, army posts, or military supply



W. H. Flynn



General Committee A. A. R.

Mechanical Division



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J. M. Nicholson



J. E. Goodwin



H. B. Bowen



A. G. Kann





J. Gogerty



A. K. Galloway

C. B. Hitch



Railway Mechanical Engineer AUGUST, 1945

depots in connection with some problem of the loading of military supplies. This committee also has an inspector continuously engaged in co-operating with the armed forces in preparing shipments of military equipment for

safe and satisfactory rail transportation.

A special committee, including representatives of the Committee on Wheels, the Locomotive Construction and the Car Construction Committees, has worked with the manufacturers of steel wheels with a view to reducing the number of designs of steel wheels. The wheel committee is also co-operating with manufacturers of chilled car wheels in the service testing of an improved wheel of this type. Another major effort of the wheel committee has been revision of the Wheel and Axle Manual which will be off the press about September 1. Other committees have worked hard and faithfully during the year and abstracts of their reports will be found in the following pages.

Research activities of the Mechanical Division have been increased along many lines during the last year and will be continued. Among important studies recently completed, or now in progress, mention may be made of the following: axles, crank pins, counterbalance standards, springs, journal bearings, lubricants for roller bear-

ings, geared hand-brakes and hot-box alarms.

Car Construction Report



Proposed recommendedpractice dimensions of coach seats based on data collected with Heywood-Wakefield measuring chair

T. P. Irving,*
Chairman

Statements covering freight cars ordered during period May 1, 1944, to May 1, 1945, provisions of Interstate Rule 3 with respect to new designs of freight cars, and box-car side door characteristics are available in the office of the secretary and will be held in abeyance until the next printed report of the committee.

Restrictions of Obsolete Types of Side Frames

The continued use of the old T- and L-section cast-steel side frames has been a matter of concern to your committee for some time. Reports of failures of these designs of side frames are increasing and appear to justify, first, that steps be taken to reduce the load limit permitted in cars so equipped and, second, setting up a future date after which T- and L-section cast-steel side frames shall be prohibited under cars moving in interchange service.

It is recommended that the Interchange Rules be revised to

1—Effective January 1, 1946, the load limit for all freight cars equipped with T- and L-section cast-steel truck side frames is restricted to the nominal capacity of the car and a star symbol (*) is to be maintained at the immediate left of the words "LD LMT."

2—Effective January 1, 1948, cast-steel truck side frames having T- or L-section compression or tension members, prohibited under all freight cars. In interchange.

Couplers Formed by Welding Parts

The Mechanical Inspection Department in its investigation of reclamation practices on the various railroads has found cases where parts of two separate couplers have been brought together and welded to form a complete unit. For example, the major shank portion of one coupler is welded to the head and shank stub of another coupler, after each such detail has been worn out or failed in service.

The matter was referred to the Coupler and Draft Gear Committee who conducted tests and recommended the present emergency welding regulations and limitations for couplers and coupler yokes as set up in Interchange Rule 23. That committee recommended that, although it is felt the welding of O. K. parts from separate couplers to form a complete unit may be successfully performed if properly supervised, a rule should not be provided that will permit this practice as a general proposition.

Your committee concurs with the recommendation of the Committee on Couplers and Draft Gears and recommends that the Arbitration Committee be requested to add a new sentence to paragraph (C-1) of Section C—Emergency Welding Regulations and Limitations, Interchange Rule 23, to read: "This rule does not permit the welding of parts of different couplers to form a complete unit for application to cars in interchange service."

Lateral Movement of Brake Beams

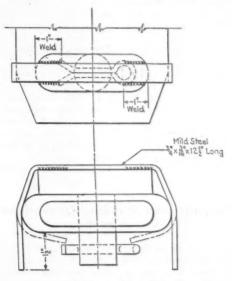
The committee recommends that the drawing for the loop-type brake-beam hanger shown on page E-6 of the Manual be revised to indicate the depth of the hanger at the center of the top and bottom bar as $1\frac{3}{16}$ in. + 0 - $\frac{1}{32}$ in. and tapered to $1\frac{3}{32}$ in. + 0 - $\frac{1}{32}$ in.

This modification is so slight it is felt the physical strength of the hanger will not be impaired to an appreciable extent. The change will permit the beam to float with the wheel and eliminate any lateral force between the shoe and head, thus reducing the wear on the toes of the brake head from this cause.

Draft-Key Retainer Lock

The matter of developing an improved type of draft-key retainer which will prevent the retainer working out and releasing the draft key, causing train separation, has been under consideration by a joint sub-committee consisting of representatives of your committee and the committee on Couplers and Draft Gears.

The committee recommends that the method of securing draft-



Draft-key retainer lock

key retainer as submitted by the joint sub-committee be adopted and added to the drawing for Standard Draft-Key Retainer shown on page C-28B of the Manual.

Recommendation by the Committee on Couplers and Draft Gears that another design of draft-key retainer illustrated in the report of that committee be submitted for adoption as an alternate standard, is being studied and will be given further consideration.

^{*} Engineer car construction, Chesapeake & Ohio.

Your committee has also recommended to the Arbitration Committee that a note be added following paragraph (d-3) of Interchange Rule 3, to read as follows:

"Note.—On new cars, or on existing cars where location of brake pipe will permit, draft key should be applied from the

brake-pipe side of the center sill."

Reason: To facilitate inspection of the draft-key retainer. This recommendation has the concurrence of the Committee on Couplers and Draft Gears.

The committee recommends that new Note No. 16 be added to the notes now printed on page L-39B of the Manual to read:

"Note 16: Refrigerator cars having adjustable bulkheads are to be stenciled to show, in addition to the normal inside length and cubic capacity (based on bulkheads in service position), the maximum inside length and maximum cubic capacity, with bulkheads in extreme end positions. This additional stenciling to be shown in parentheses."

Welding of Car Parts

At suggestion of the Committee on Brakes and Brake Equipment, it is recommended that a new item be added to Section B of Interchange Rule 23 to read:

"Reservoirs, Auxiliary and Emergency Air Brake, Cast Iron

. . No welding permitted."

No regulations have been formulated covering welding on coupler draft keys and questions have been raised with respect to building up worn surfaces on this item.

Standard Coach-Seat Dimensions

The report of the sub-committee was approved with the understanding that the recommendations contained therein would be submitted for adoption by Letter Ballot as Recommended Practice

rather than Standard Practice.

This report has been submitted to representatives of the Territorial Passenger Association for concurrence or comment, who advised as follows: "Our committee has reviewed the report and also inspected the measuring chair used in this study. In addition, we have gone over the process by which the various suggested dimensions were obtained. We are in accord with the report of your sub-committee and suggest it be submitted to the member roads as proposed.

Letter Ballot Items

It is recommended that the following recommendations contained in this report be submitted to Letter Ballot of the members.

1-Effective dates regarding T- and L-section cast-steel truck side frames.

2—Change as recommended in loop-type brake hangers to provide for taper of the top and bottom bars.

3—Change in method of securing draft-key retainer as covered by sketch.

4—Addition of new note No. 16 to cover dimension markings

for refrigerator cars equipped with adjustable bulkheads.

5—Addition of new paragraph to Section B of Interchange
Rule 3 to prohibit welding of cast-iron air-brake reservoirs.

6-Addition of new paragraph to Section B of Interchange Rule 3 on the reclamation of draft-gear keys.

7-Adoption as recommended practice of standard dimensions of coach seats.

Sub-Committee on Standard Dimensions for Coach Seats

The Sub-Committee on Standard Dimensions for Coach Seats contacted the principal coach-seat manufacturers as to building seats in the future to certain principal dimensions without interfering with their individual product as to design, appearance, etc., and all advised that they are willing to cooperate and that such principal dimension standardization is agreeable to them.

The Heywood-Wakefield Company appropriated a fund to assist in this study of determining such principal dimensions and constructed a special measuring chair, as well as arranged for accurate measurements of individuals under the direction of Dr. E. A. Hooton, head of the Harvard University Department of Anthropology, which specializes in accurate measurements of

human anatomy, and who had made similar studies for military authorities and others.

The chair was set up at the Boston & Maine station in Boston, Mass., and the Chicago & North Western station in Chicago, where measurements were taken from 3,867 adult individuals, constituting a reasonable representative sample of the population of the United States, especially that portion of the population which habitually uses railroads.

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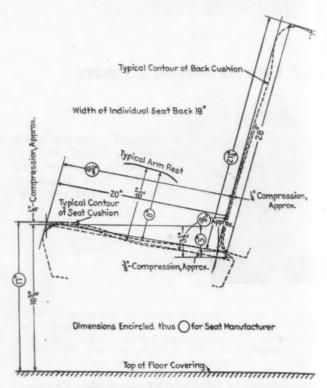
The measurements taken were as follows:

1—The seat was raised until the individual's feet were not in firm contact with the floor. The lower legs were allowed to hang straight down. A seat-length rod was then pulled out until it contacted the uppermost part of the lower leg behind the knee.

2—The seat was slowly lowered until the individual's feet rested firmly on the floor. The firmness was determined by questioning the individual and by grasping one of his feet and attempting to move it. The seat was never lowered so far that the popliteal area (the lower portion of the upper leg just behind the knee) was not in contact with the seat surface.

3—The individual was asked to place his forearm on (and parallel with) the arm rest, which was raised or lowered until the individual's shoulders were level and the angle between his upper arm and forearm was about 90 deg. This position, by the way, was described by the majority as comfortable.

4—The hip breadth was measured by bringing the arms of a calibrated hip-breadth rod together until they contacted the portions of the buttocks or upper thighs expanding to the maximum



Coach-seat dimensions proposed for recommended practice

"spread." Care was taken not to include objects in pockets and enough pressure was exerted to compress the clothing if it was loose.

5—The back height was measured by pulling up a back-height rod and placing the crutch-like end of its transverse arm (at right angles to the rod and extending forward towards the back of the subject's head) at the point of junction between the head and neck. This point, roughly called the nape of the neck, is actually the region of the first and second cervical vertebrae and is easily located in most people, even in women with long hair. During this measurement the subject was, if necessary, asked to sit erect.

6—The shoulder breadth was taken by bringing the arms of a shoulder-breadth rod together until they touched the individual's deltoid muscles (the point of maximum lateral expansion). If the individual tended to hold his arms out from his body, this was corrected by requesting him to keep his arms against his body.

-The individual was asked to step onto the scales where his height (within 1/4 in.) and his weight (to the nearest pound) was recorded. Average weight of all subjects was found to be 152.8 1b. The average height of males was found to be 69 in., and for females, 64.9 in,

In addition to these measurements, the following was obtained: Age (38.45 years for males and 35.55 for females); birthplace (number of foreign born is proportional to total adult population); type of heel, for females only (12.5 per cent low heels, 52.3 per cent medium heels, and 35.2 per cent high heels); whether or not shoes were habitually removed when traveling by train, for females only (70.5 per cent do not have any desire to remove shoes when riding on train).

In order to make a representative study, an effort was made to: (1) prevent any age group (as, say, individuals 18 to 20 years old) from becoming greatly superior numerically to the other age group; (2) obtain an equal number of males and females; (3) obtain people from all economic and social levels.

All information obtained was statistically arranged and the

following principal dimensions were determined:

SEAT HEIGHT

This is probably the most important measurement and in order to ascertain the distance from the popliteal area to floor (seat height), the thigh could be parallel with the floor and knee should be bent at right angles with all pressure relieved at the popliteal area. It was found that 16¾ in. seat height at the front edge was the most desirable and while this height may be a trifle low for tall people, it is not uncomfortable for short people; whereas a seat too high is distinctly uncomfortable for short people—the long-legged can adjust themselves to this height by resting the feet on the floor forward of the vertical front edge of the seat to the floor.

SEAT LENGTH AND DEPTH

Two problems were considered:

1—The long-legged must be accommodated, since a seat length too short results in the underside of the thigh near the knee (the popliteal area) pressing heavily on the edge of the seat. This pressure is highly uncomfortable if maintained for any length of time.

2-The short-legged must be accommodated, since a seat length too long prevents the normal bending of the knee unless the individual sits forward and away from the back of the seat.

It developed that a seat length, or depth, of 20 in. would accom-

modate 90 per cent of all individuals.

If the back of the seat is convex because of upholstery, then the seat length, or depth, must be increased correspondingly.

SEAT BACK HEIGHT

The requirements for this height is that support be furnished at the base of the skull and a height of 28 in. was found to be most suitable. This dimension can be lowered in this way only if a compensating increase in length of seat is made so that tall individuals can slump down.

ANGULARITY OF SEAT BACK

An angle of approximately 96 deg. was found, in the past, to be a good general average.

HIP AND SHOULDER BREADTH

Nineteen-inches width of seat and seat back was found to be the most practical, which would allow ample space between individuals. It was found that small individuals are as comfortable, or more comfortable, in a wider seat than in a seat the width of which is commensurate with their shoulder breadth. This distance also allows for top coats, padded shoulders, and some degree of movement.

ARM-HEIGHT REST

The measurement depends chiefly on the proportion of the length of the upper arm to the length of the torso. Thus, a man with a long torso and long arms can have the same elbow height as a man with a short torso and short arms. An arm rest height of 81/2 in, was found to be the most convenient and a higher rest required either an uncomfortable hitching up of the shoulders, or extra lateral space on the seat so that elbows may hang inside the rest.

ALLOWANCE FOR COMPRESSION IN CUSHIONS

Compression is not a precise problem when humans are involved. Compression depends on the amount of weight applied to the surface to be compressed, the area compressed by the weight, distribution of the weight along the area of compression, elasticity of the cushion, and variation in the compressibility near the supporting frame of the cushion and further from it. Compression figures developed must be considered as general only, as a person does not always sit upright in one defined spot and the slightest

Dimensions Proposed as Recommended Practice for Future Coach Seats*

re	imension equired er survey	Correction for for compression	r seat manu-	33 of	des	e of signs ts as tted
Seat height at front edge of seat, in	1634	3/4	17	16	to	18%
Seat length, or depth, in	20 31/2	3/4	1934	18	to	21 334
Seat back height, in. Angularity of seat	28	3/4	271/4	2234		281/2
back, deg	96	* *	96 (Approx.)	90	to	110
seat back, in Arm-rest height	19		19	1756		
from top of seat,	81/2	3/2	8	5	to	93/4

* Submitted by seat manufacturers and railroads.

shift of weight effects compression. Also, the variations of body builds affect the placements of weights and thus compression.

Consideration was given to the possible standardization of following additional coach-seat details; however, this was not found practical: Shape of seat and back cushions, overall width of coach seats, reclining of seat backs, rotating and reclining mechanism, arm rests, foot rests, seat pedestal, and seat spacing.

Sub-committee wishes to express their appreciation to the Haywood-Wakefield Company in giving their valued assistance in this study.

The chairman of the sub-committee is J. K. Peters, mechanical engineer, Denver & Rio Grande Western.

Report of **The Arbitration Committee**



Some rules clarified, procedure under others simplified-No extension for use of welded T- or L-section truck side frames

> J. P. Morris,* Chairman

During the year Cases 1803 to 1811, inclusive, have been decided and copies sent to the members. Due to increasing failures of truck side frames having T- or L-section compression or tension members, no extension beyond January 1, 1946, is recommended for the requirement in Rule 3 prohibiting application of such welded frames.

With the concurrence of the Committee on Brakes and Brake Equipment, it is recommended that the requirement in Rule 3 with respect to metal badge plates for brake levers be modified to include only cars equipped with AB brakes, to become effective July 1, 1946. With the concurrence of the Committee of Brakes and Brake Equipment, it is also recommended that requirement in this rule covering nominal braking ratio for cars with single capacity brakes be reduced from 60 per cent to 50 per cent of the empty car weight.

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^{*} General mechanical assistant, Atchison, Topeka & Santa Fe.

Modification of Rule 17 is recommended to provide in cases of owner's defects that bolts substituted for rivets where rivets are standard to the car shall be classed as temporary repairs, no bill, instead of improper repairs as now constituted.

No extension beyond January 1, 1946, is recommended for the requirement in Rule 23 prohibiting the welding of truck side frames having T- or L-section compression or tension members.

With the concurrence of the Committee on Wheels, it is recommended that a new Fig. 4-D, which is a reproduction of Fig. 130 of the Wheel and Axle Marual, be added to the Code.

An additional paragraph in Section B of Rule 112 is recommended to provide a basis for arriving at reproduction costs for freight equipment cars where definite per pound prices are not established.

With the concurrence of the Committee on Car Construction, a new paragraph (g) is recommended for addition to Passenger. Car Rule 2 requiring approval by the Mechanical Division of new or modified designs of passenger car trucks.

Addition of new Rule 11 to the Passenger Car Code is recommended to provide for material ordered from the owner for repairs to passenger equipment cars.

The Committee does not feel that any of the modifications included in its report necessitate submission to letter ballot.

Rule 3

The Committee recommends that effective dates for various requirements in the present rule, as listed below, now set at January 1, 1946, be extended to January 1, 1947:

Section (b), paragraph (9)—Braking power: braking ratio, Section (c), paragraph (10)—Couplers having 5-in, by 5-in, shanks, Section (c), paragraph (11)—Couplers having 5-in, by 7-in, shanks, Section (c), paragraph (12)—Couplers, bottom rotary operated, not equipped with assembled riveted-type lock-lift lever and toggle. Section (t), paragraph (10)—Tank cars: metal placard holders. Section (u), paragraph (4)—Class E-3 cars not to be accepted from owner.

The matter of extension in effectives dates for requirements involving AB brakes and bottom-rod and brake-beam safety supports is before the General Committee.

The Committee recommends that no extension beyond January I, 1946, be granted in the effective date of the requirement in Paragraph (t-3) of this rule prohibting the application of welded truck side frames having T- or L-section compression or tension members.

Reason: This requirement has appeared in the rules since August 1, 1938, as result of letter ballot Circular DV-936. Due to increasing failures of these designs of side frames, it is felt no further extension in effective date of the requirement should be granted.

The Committee recommends that a new note be added to Paragraph (b-1) of this rule, effective August 1, 1945, to read as follows:

Note: Cars equipped with hangerless type brake beams, used with Unit trucks, will be accepted in interchange.

Reason: To provide for acceptance in interchange of cars equipped with Unit trucks having hangerless type brake beams. The Committee recommends that Paragraph (b-7) of this rule be modified, effective August 1, 1945, as follows:

Proposed Form: (b-7) Brake levers: Metal badge plate meeting A. A. R. requirements and fastened to underframe in an accessible location preferably near the air brake cylinder and on the same side of the car, showing dimensions of the brake levers standard to the car, required on all cars built new or rebuilt on or after August 1, 1929. Effective July 1, 1946, the foregoing requirement will also apply to all cars equipped with AB brakes. From owners.

Reason: It is felt cars in service built prior to August 1, 1929, which have not been equipped with badge plates, are mostly cars with brakes of miscellaneous designs for which it is difficult to standardize on suitable badge plates, and that such cars will be retired from service when conditions permit; and, in the meantime, acceptance of such cars from owners or in interchange should not be prohibited. However, if such cars are equipped with AB brakes, the brake arrangement will be more or less standard and no hardship is created in providing the necessary badge plates. This recommendation has the concurrence of the Committee on Brakes and Brake Equipment.

The Committee recommends that Paragraph (b-9) of this rule be modified, as follows:

Proposed Form: (b-9) Braking power: On and after January 1, 1946, all freight cars offered in interchange having single capacity brakes shall have a nominal braking ratio of not less than 50 per cent nor more than 75 per cent of the empty car weight, based on a brake-cylinder pressure of 50 lb. per sq. in, except refrigerator cars which shall have a nominal braking ratio of not less than 50 nor more than 60 per cent of the empty car weight, based on 50 lb. per sq. in. brake-cylinder pressure. In interchange.

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Reason: In view of minimum braking requirements having been provided for the loaded car, the 50 per cent minimum will provide adequate braking for the empty cars, as recommended by the Committee on Brakes and Brake Equipment.

The Committee recommends that Paragraph (c-12) of this rule be modified, as follows:

Proposed Form: (c-12) Coupler, A. A. R. Standard Type E bottom rotary operated, must be equipped with assembled riveted-type lock-lift lever and toggle E-14 (instead of separate lock-lift lever E-8 and separate toggle E-7), on and after January 1, 1946. In interchange.

Reason: To clarify the intent.

Rule 5

The Committee recommends that the second paragraph of Rule 5 be modified, effective August 1, 1945, as follows:

Proposed Form: To justify bill, repairs authorized by defect card must be made within two years from the date of first receipt of car on home line, except wrong repairs, which must be corrected within nine months from date of first receipt of car on home line. However, if wrong repairs of brake beams, brake hangers, brake levers, brake rods, carrier irons, couplers and parts, draft stops, side bearings, door fixtures, bolts in place of rivets, or wrong size bolts or pins, are not corrected within nine months from date of first receipt of car on home line, or not corrected on any line within one year from date of such wrong repairs, counterbill for correcting same is prohibited.

Reason: Car owner should absorb expense of correction after these details have given the specified length of service.

Rule 9

The Committee recommends the following requirement be included in this rule opposite item of Wheels and Axles, R. & R., effective August 1, 1945:

Where axle applied or removed is of tubular (hollow) design, so state.

Reason: To provide the owner with information as to performance of this type of axle.

Rule 10

The Committee recommends that the first sentence of the second paragraph of this rule be modified and a new last sentence added to read as follows:

In all cases of multiple-wear wrought-steel wheels, the amount of service metal in the tread must be shown before and after turning, measured from the center of the tread to the condemning line which is located 1/4 in. above the measuring point; also show amount of service metal on the other wheels applied, based on full flange and tread contour. It must also be stated whether such wheels have standard full flange and tread contour. This information must be reported to car owners regardless of whether or not repairs are chargeable to owners. For one-wear wrought-steel wheels, see Section (i) of Rule 98.

Reason: To eliminate confliction between Rules 10 and 98.

Rule 17

The Committee recommends that the first sentence of Section (d) of this rule be modified, effective August 1, 1945, as follows:

Proposed Form: Bolts substituted for rivets, in cases of owner's defects, where rivets are the standard of the car, are considered as temporary repairs, no bill, except where used in securing ladders, ladder treads, handholds, sill steps and uncoupling lever brackets on all cars of all types; also, proper to use bolts for securing coupler and draft-gear supports on tank cars; except, that in no case shall bolts be substituted for rivets which pass through the shell or metal jacket of the tank of tank cars.

Reason: To eliminate the use of defect cards, also charges, for repairs of this nature.

Rule 19

The Committee recommends that no extension beyond January 1, 1946, be granted in effective date of requirement in Item 14 of this rule prohibiting the application of welded truck side frames having T- or L-section compression or tension members.

Rule 21

The Committee recommends that Paragraph (c) of this rule be modified, effective August 1, 1945, as follows:

Proposed Form: Rule 21. Bills may be rendered against car

(c) For other temporary repairs at car owners' expense, only when authorized by car owner, except as otherwise provided in Note F of Rule 44.

Reason: To eliminate confliction with Rule 44.

Rule 23

The Committee recommends that no extension beyond January 1, 1946, be granted in effective date of requirement in this rule prohibiting the welding of truck side frames having T- or L-section compression or tension members.

Rule 60

In view of Circular DV-1082 dated February 15, 1945, providing the C. O. T. & S. of AB brake equipment on cars stenciled "AB Brake—Experimental," Note 2 following Section (m) of this rule, reading as follows, has been eliminated:

Note 2: Cleaning periods established for AB type freight brake equipment are not applicable to cars bearing stencil "AB Brake-Experimental." Such brake equipment must be handled in ac-

cordance with Circular No. DV-829.

Rule 63

The Committee recommends that Paragraph (4) of this rule be modified by addition of italicized words, to read as follows:

(4) Brake beam hanger pins, bolts or brake connection pins, originally in excess of one inch in diameter, if worn to 1/8 in. or less at any point.

Reason: To provide wear limit for brake connection pins.

New Fig. 4-D

The Committee recommends that a new Fig. 4-D, which is a reproductions of Fig. 130 of the Wheel and Axle Manual, be dded to the Code. (Present Fig. 4-D to be relocated as new ig. 4-E and necessary references to be made in Fig. 4-A, Rule 76 and Passenger Rule 7 to harmonize.

Reason: To clarify the intent, as recommended by the Com-

mittee on Wheels.

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Rule 87

The Committee recommends that Section (a) of this rule be odified, effective August 1, 1945, as follows:

Proposed Form: (a) Any company making improper repairs by using material which the repairing line should carry in stock, is prescribed in Rule 122, is solely responsible to the owners, with the exception of the cases provided for in Rule 57. Such mproper repairs must be corrected within nine months after the first receipt of the car on home line, to justify the bill. However, if wrong repairs of brake beams, brake hangers, brake evers, brake rods, carrier irons, couplers and parts, draft stops, ide bearings, door fixtures, bolts in place of rivets or wrong size bolts or pins, are not corrected within nine months from the date of the first receipt of the car on home line, or not corrected on any line within one year from the date of such wrong repairs, counterbill for correcting same is prohibited. In all cases of improper repairs where defect card is attached to car, a notation to that effect should be made on the billing repair card. Reason: Car owner should absorb expense of correction after these details have given the specified length of service.

Rule 94

The Committee recommends that the first paragraph of this rule be modified, effective August 1, 1945, as follows:

Proposed Form: For repairs made on authority of A. A. R. defect card, the defect card, together with a billing repair card, must accompany the bill, subject to the requirement that repairs must be made within two years from the date of the first receipt of the car on the home line, except wrong repairs which must be corrected within nine months from the date of the first receipt of the car on the home line, to justify the bill. However, if wrong repairs of brake beams, brake hangers, brake levers, brake rods, carrier irons, couplers and parts, draft stops, side bearings, door fixtures, bolts in place of rivets, or wrong size bolts or pins, are not corrected within nine months from the date of the first receipt of the car on the home line, or not corrected on any line within one year from the date of such wrong repairs, counterbill for correcting same is prohibited. In the case of repairs covered by defect card, if the owner changes the original standard of parts so involved, the charge must be no greater than if the original design had been followed.

Reason: Car owner should absorb expense of correction after these details have given the specified length of service.

The Committee recommends that the last paragraph of this rule be modified, effective August 1, 1945, as follows:

Proposed Form: No bill shall be rendered for repairs not made. However, where a car reaches home with the defect cards attached under provisions of Rule 112, or with other unfair usage damage covered by defect card, and owner elects to retire instead of repair car, charge may be made for material and labor as would have been required for repairing or renewing items actually listed on the defect card, excluding labor and material for undamaged associated parts except where the allowances in Rule 107 include labor for R. & R. of such associated parts. In no case, however, shall the total bill exceed the A. A. R. depreciated value of the car, less salvage.

Reason: To simplify the preparation of bills under the provisions of this rule. It is felt the small amount of labor charges

involved can consistently be included.

Rule 98

The Committee recommends that Paragraph (c-5) of this rule

be modified, effective August 1, 1945, as follows:

Proposed Form: (5) Serviceable experimental cored hub wheels marked "A. A. R. X." when removed from service on account of defect in axle or mate wheel, shall be credited as scrap except when removed on account of Rule 32 or Rule 84 condition in which event second-hand credit must be allowed for such undamaged wheel or wheels.

Reason: Car owners invariably do not desire to have these wheels returned and they are scrapped. This change will eliminate considerable unnecessary correspondence and has the concur-

rence of the Committee on Wheels.

Rule 107

The Committee recommends that preamble to this rule be modified, as follows:

Proposed Form: Rule 107. The following table shows the labor charges which may be made for performing the various operations shown. The labor allowances include all work necessary to complete each item of repairs, unless the rules specifically provide that in connection with the operation additional labor may be charged for the R. and R. of any item which must necessarily be R. and R. in connection therewith.

The labor charges in this rule, as well as Rules 98, 101 and 111, in addition to including the actual labor cost of performing the work, include the following items of indirect expense:

Wages of foremen, assistant foremen, gang foremen, inspectors, clerks, messengers, watchmen, janitors, laborers, etc. work-

ing in connection with freight car repairs.

Proportion of expense of operating power plants, power purchased, shop switching, wages of operators and directors of cranes and tractors, tool room attendants, machinery oilers, and other facility operators, tools, fuel, lubrication, water, other supplies, etc.

Proportion of salaries and expenses of chief mechanical officers and their office and supervisory forces, regional supervisory and

accounting forces.

Proportion of expense of maintenance of facilities (tracks, buildings and machinery) and fixed charges on facilities such as interest, taxes, depreciation and insurance on land, track buildings and machinery.

Workmen's compensation, carriers' taxing act of 1937, railroad

unemployment act and vacations with pay.

No element of profit is included in the A. A. R. labor charges. Reason: To more clearly define the elements of costs incorporated in the overhead allowance.

Rule 112

The Committee recommends that Paragraph 2 and 3 of Section B of this rule be combined as new paragraph 2 and a new paragraph 3 added, effective August 1, 1945, to read as follows:

2. Where cast- or pressed-steel extensions are used and riveted to metal center or draft sills between bolsters they shall be considered as continuous. The cover plate may be part top and part bottom, providing the specified length is covered.

3. Where per pound settlement prices are not provided and the rules specify settlement on reproduction cost basis, cost or reproduction in kind at date of destruction shall be obtained by adjusting the original cost to date by the relation of costs as between those in the year built and in year prior to the date destroyed, on the basis of percentages of costs as issued by Joint Equipment Committee—Costs of Railroad Equipment and Machinery—published by the A. A. R. Finance, Accounting, Taxation and Valuation Department, Washington, D. C.

Reason: To establish an equitable and uniform basis for arriving at reproduction cost of freight equipment cars where perpound prices have not been established.

Passengér Rule 2

The Committee recommends that the effective date of Paragraph (e) of this rule with reference to equipping all-steel or steel-underframe cars with cardboards or suitable receptacles for accommodation of defect and joint-evidence cards, and effective date of Paragraph (f) covering the application of brakeshoe spark shield to passenger train cars having underneath exposed wood parts over wheels, both requirements now being set at January 1, 1946, be extended to January 1, 1947.

Reason: The present situation justified these extensions.

The Committee recommends that a new Paragraph (g) be added to this rule, effective August 1, 1945, to read as follows:

(g) No car equipped with trucks of an untried type, whether trucks are built new or existing trucks with construction substantially changed, shall be offered or accepted in interchange, nor accepted from the car owner, until such trucks have been approved by the Mechanical Division of the Association of American Railroads.

Reason: To require approval of new or modified designs of passenger car trucks, in connection with revised definitions for passenger-train cars adopted by letter ballot this year. This recommendation has the concurrence of the Committee on Car Construction.

Passenger Rule 7

The Committee recommends that the third sentence of Paragraph (e-1) of this rule be modified by the addition of italicized portion, effective August 1, 1945, to read as follows:

Axles standard to the car must be maintained, except the 1940 A. A. R. standard passenger car axle may be substituted for the former standard axle, charge and credit to be on basis of material applied and removed. In case of handling line responsibility, betterment charge may be made for the 1940 A. A. R. standard passenger car axle on basis of its second-hand value. When former standard is substituted for the 1940 standard, proper charge and credit must be made and defect card issued for labor only.

Reason: To provide for substitution of 1940 A. A. R. standard passenger car axle and charges and credits in connection therewith.

The Committee recommends that Section (f-12) of this rule be modified, as follows:

Proposed Form: (12) Thin Rim—Wrought-steel wheels: If the tread is worn so that tread thickness is 1 in. or less. See Fig. 4.

Steel-tired wheels: If tread is worn to within ¼ in. of measuring line (inside edge of limit of wear groove) as shown in Figs. 1, 2 and 3.

Service metal and tread thickness of wrought-steel wheels shall be measured by the A. A. R. standard steel-wheel gage or its approved equivalent, applied as shown in Figs. 4-A and 4-D of the freight code, with due consideration to 1 in. thickness condemning limit for passenger car service.

Reason: To clarify the intent, as recommended by the Committee on Wheels.

Passenger Rule 11

The Committee recommends that new Rule 11 be added to the passenger code, effective in the August 1 supplement, to read as follows:

Rule 11. Material ordered from car owner shall be handled as outlined in Rule 122 of the freight code.

Reason: To clarify the intent with respect to material ordered from owner for repairs to passenger cars.

Passenger Rule 22

The Committee recommends that first and second paragraphs of third note following Item 60 of this rule be modified, effective August 1, 1945, as follows:

Proposed Form: Notes Material not listed above, but listed in Rule 101 of the freight car rules (if same as that used on freight car) shall be charged at prices shown in Rule 101. All other material to be charged at net store department cost.

Reason: To clarify the intent with respect to material ordered from the owner for repairs to passenger cars.

Lubrication Of Cars and Locomotives



The report recommends that the roll method of packing be submitted to letter ballot for inclusion as alternative on Rule 66 Jan Feb Ma Apr Ma Jun Juli Aus Sep Oct Nov Dec

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J. R. Jackson, Chairman

Returns from the survey, made during the year of practices in packing journal boxes, indicate that the one-piece method of packing is followed by the majority of member roads. Under Rule 66, the method of application of the packing has been left optional, although the one-piece method has been set up as preferable since 1938.

The question of a mandatory method of packing boxes has been considered but the committee has not been able to agree on any one method. The committee holds that any of several methods

Results of Survey of Methods of Packing Journal Boxes

	Number of	member roads	using
Journal boxes on— (1) Locomotive tenders	One-piece* method 62	Roll method 32	Miscel. methods
(2) Passenger equipment cars: (a) On-line service (b) Interchange service	. 56	30 29	2 2
(3) Freight equipment cars: (a) On-line service (b) Interchange service		23 23	2 2
* With back roll, Fig. 1, Rule 66.			

of packing boxes will give satisfactory results and that the matter should remain optional.

Recognizing that the roll method is preferred over the onepiece method by approximately 25 per cent of the member roads covered by the survey, the committee has revised the A. A. R. standard practice, as covered by Par. (b), Rule 66, to include the roll method and show this method by drawing to amplify Fig. 1 in the present standard method of packing made a part of Rule 66. It is recommended that the revision shown in Exhibit A be submitted to the Association as a letter-ballot item.

^{*} Engineer of tests, Missouri Pacific.

Tabulation Compiled from Monthly Freight Car Hot-Box Statistics as Reported by the A. A. R.

111111111111111111111111111111111111111		Total freight-	car mileage			Total car	set-outs		A	verage mil	es per set-	out*
Month	1942	1943	1944	1945	1942	1943	1944	1945	1942	1943	1944	1945
January		2,999,962,588	3,293,864,472	3,016,370,744		7,760	5,978	8,263		386,593	550,999	365,045
February		2,865,616,217	3,174,542,468	2,888,302,726		8,698	6,442	8,468		329,456	492,788	340,966
March	A. A.	3,272,300,869	3,454,052,285	3,430,648,710‡	**	9,067	7,177	9,9471	**	360,902	481,267	344,8931
April		3,233,014,225	3,342,340,489	3,341,069,9561		8,545	7,274	10,633‡		378,452	459,491	314,217\$
May	HOME THE WA	3,412,690,321	3,464,606,409			11,598	12,305			294,147	281,561	
Tune		3,231,415,378	3,327,747,609			19,625	16,619			164,658	200,238	
July	**	3,430,981,134	3,443,235,673		6.0	21,313	16,698			160,981	206,206	
August		3,462,317,281	3,443,448,023			18,296	15,381			189,239	223,877	
September†	3,191,618,297	2,401,363,195	3,318,593,893		13,941	12,203	10,967		228,938	278,732	302,598	
October	3,402,371,306	3,475,645,092	3,490,271,418		9,204	7,945	7,813		369,662	437,463	446,726	
November	3,172,846,122	3,222,209,578	3,253,587,840		5,833	5,081	5,078		543,948	634,267	640,975	2.1
December	3.026,680,774	3,182,786,375	3,112,425,198		5,237	4,968	4,877		577,942	667,532	638,184	
*Account hot-boxes.			134-114									
†Records begin Septe	ember, 1942.											
Figures for March as	nd April, 1945, a	dded by the edit	tor.									

Roller Bearing Lubrication

Locomotive Construction

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net/ 945 During the year roller-bearing assemblies for 5½-in. by 10-in. journal boxes from the S. K. F. and the Hyatt companies have been delivered to the Indianapolis laboratory and some exploratory work completed with the S. K. F. assembly installed on the testing machine and using stock oils furnished by committee member roads. The work at the Indianapolis laboratory has been carried along by three resident representatives, each spending two days a week while the plant is being operated. The program embraces study and rating of the lubricants on the basis of lubrica-

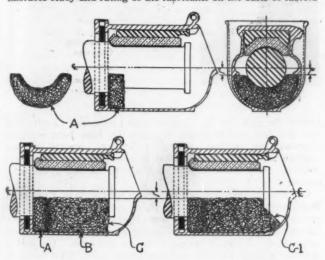


Fig. 1-Proposed standard one-piece method of packing journal boxes

tion, stability and action on the metals. From the work done to date, the indications are that the committee is developing valuable information relative to roller bearing lubricants which it is hoped will permit of recommendations leading to more uniformity of practice and improvement in performance in the field of lubrication of roller bearing equipment on the railroads.

It is recommended that this research project be continued during the coming year.

Journal-Box Lids

The study of journal-box lids has been progressed during the year by a subcommittee collaborating with representatives of the Car Construction Committee and the manufacturers. The subcommittee has extended its activity to include a survey of journal-box lids on cars in service along with a check of specimen lids furnished by the manufacturers to the proposed revised specification mentioned in our 1944 annual report.

The work of this subcommittee will be carried along during the coming year and recommendations for changes in Spec. M-120—Journal Box Lids, submitted as a letter ballot item as soon as possible.

Packing-Retaining Devices

The committee has continued to study the more promising developments in waste-retaining devices and, based on impact

tests of cars equipped with the packing retainer-spring device designated as the Hold-Rite Packing Retainer, as well as service tests on cars of railroads represented on the committee; feels warranted in approving the use of this patented device for the purpose of holding packing in place in the journal box and to assist in prevention of waste grabs.

There are no restrictions as to the use of the device on interchange cars. However, in order to protect and continue in service such devices as have been applied to cars moving in interchange service, it is recommended that a note be included under Rule 66 in the interchange code to provide that this device should be reapplied when in serviceable condition and standard to car, when wheels are changed, journal bearings removed or journal boxes repacked. While it is felt no penalty should be provided at this time for failure to renew the spring retainer, it is considered that a note in the interchange code directing attention to the matter will be helpful in maintaining the device in service.

Tabulation of the monthly statements of freight-car hot-box records on all A. A. R. member roads, as compiled by the secretry's office, starting with September, 1942, and through February, 1945, is presented in one of the tables. This is an extension of a similar tabulation presented in our 1944 report and is here brought up to date as information.

Accidents Due to Hot Boxes and Burned-off

This study is being progressed through the research program being carried out at Altoona, Pa., under the direction of a Committee on Hot-Box Alarm Devices set up in accordance with the lubrication committee's recommendations at the 1944 annual meeting. The lubrication committee has held two meetings at Altoona during the year to give the members the opportunity of keeping informed as to the progress of the investigation of hot-box alarm devices.

The lubrication committee again emphasizes the importance of magnaflux inspection of all journals involved in overheatings where journal surfaces and ends of axles show pronounced coloring. It is recommended that Par. 355 (o) of the Standard Rules Covering Wheel Shop Practice in the Wheel and Axle Manual, as made mandatory through Interchange Rule 69, be enforced.

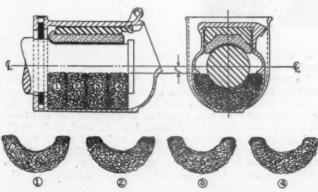


Fig. 2-Roll method of packing boxes-No: 4 roll sized to fill without additional small piece

Exhibit A-Journal Boxes, Standard Method of Packing

Proposed Form. (Sec. 4, Sub. Sec. (b)) Body of Packing—Apply sufficient packing in one piece, as shown in Fig. 1, or in rolls, as shown in Fig. 2, to firmly fill the space under the journal so as to prevent settling away, care being taken to have packing bear evenly along the full length of the lower side of the journal.

(c) One-Pièce Method—This is best accomplished by placing the packing across the full width of the mouth of the journal box and allowing the strands to hang down outside, always adding more packing before placing the hanging strands inside the box This has the effect of binding all of the body of the packing in one mass. The top of the packing must be at least 1 in. below the center line of the journal, along the sides, to insure against the waste rolling under the bearing. After the body of the packing has been applied firmly from the back roll to the inner or back face of the journal collar, it must be finished off at the front or outer end, straight down from the inside face of the journal collar as shown at C Fig. 1, or may be inclined toward the front of the box as shown at "C-1," Fig. 1. No loose ends or threads should protrude at the sides or ends, such ends being carefully tucked under the sides of the packing; nor should any pieces of packing be laid along the side of the journal, as such pieces may become caught under the bearing and cause a bot box.

(d) Roll Method—This is best accomplished by lightly twisting prepared packing, made by the box packer, by hand, of suitable size, with the ends turned under, to fill the space between the journal and journal box, exactly as now in use as the back roll in Fig. 1. The other three rolls to be loosely matted prepared packing, with the ends turned under and of sufficient length and diameter to fill the remaining space under the journal, marked Rolls 2, 3 and 4 in Fig. 2. The loosely-matted packing must be firmly applied from the back roll to the inner or back face of the journal collar and must be finished off at the front or outer ends, straight down from the inside face of the journal collar, as shown for Roll 4, Fig. 2. No loose ends or threads should protrude at the sides or ends and any loose ends should be carefully tucked under the sides of the packing. The original

subsection (d) of Sec. 4 is redesignated (e).

Report on Loading Rules



Changes pending involve special army supplement 2, wood and steel products, items of machinery and industrial equipment

W. B. Moir,*
Chairman

The committee submits the following report on the subjects handled since its last report dated May 23, 1944.

The 1945 issue of Rules Governing the Loading of Commodities on Open Top Cars, in addition to incorporating all information contained in Supplements 1 and 2, as well as Sec. (B) of the 1944 report, also includes a number of additions and revisions, whole or in part, namely: Additions, Figs. 21, 79-C, 79-D, 79-E, 79-F and 209-B1; revisions in Rules, 3, 4, 5, 6, 9, 10, 12, 13, 15, 16, 21 and Table 2, and in Figs. 6, 6-A, 6-B, 35, 35-A, 36, 43, 65, 65-C, 76, 79, 84-A, 110, 111, 171, 205, 216 and 217.

The following subjects are still under consideration by the

* Chief car inspector, Pennsylvania.

committee and will entail revision of present figures and specifications, or formulation of new methods of loading: Lumber, piling, poles, box shooks, girders, bars, plates, sheets, structural shapes, metal tropical huts, wire mesh, machinery, wire rope on reels, boilers, cranes, corn pickers, threshers, tractors, ingot moulds hot tops clay pine automobiles.

moulds, hot tops, clay pipe, automobiles.

A revision of Special Army Supplement 2 is pending, which will include revisions of existing Figs. A, B, C, D, F, G, H, J and K, and incorporate definite specifications and drawings for the following units: ¼-ton 4-by-4 trucks, single- and double-deck, also in inclined position; truck trailers, 45-ton tank transporter; trailer portion of tank recovery unit; 2½-ton 6-by-6 trucks in steel floor cars; two-wheel cargo trailers; M-4 medium tanks, wire tied; M-26 heavy tanks, wire or rod-tied.

Locomotive Construction



Trucks of Diesel switchers being standardized— More steam-pipe sizes proposed—Details of boiler design recommended SUR

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H. H. Lanning,* Chairman

During the past year the Committee on Locomotive Construction has held but two meetings. Its activities have been seriously restricted by wartime conditions; however, several subjects referred to us have been handled by correspondence and others which are now under consideration will be handled in the same manner.

On May 1, 1945, restrictions placed by the War Production Board upon the manufacture of rolled steel wheels for railroad equipment (Order No. L-211) were rescinded. Under this order the manufacturers of rolled steel wheels were permitted to produce only wheels of certain standard designs and sizes. The manufacturers are still under heavy commitments to our allied countries and to builders of equipment intended for use in those countries. In view of these commitments, manufacturers state that they can supply wheels needed by American railroads only by the avoidance of a return to the multiplicity of designs and sizes in use at the beginning of the war.

It is obvious that the interest of both manufacturers and consumers of rolled steel wheels can best be served by the adoption of the smallest number of standard designs and sizes which can be reasonably made to meet requirements. To this end, representatives of this and other committees of the Mechanical and Electrical Sections, A. A. R., are co-operating with duly accredited representatives of the rolled steel wheel manufacturers. Definite progress has been made and it is expected that the work of standardization will be completed at an early date, at which time recommendations will be promptly made for submission to letter ballot.

It is recommended that the item covering additional dry pipe and steam pipe sizes and the changes in page F-6A of the Manual, be submitted to letter ballot.

[The following sub-committee reports were presented by the committee.—Editor.]

Oil Electric Locomotives

The sub-committee on this general subject is following a number of items and submits the following report:

^{*} Mechanical engineer, Atchison, Topeka & Santa Fe.

SURVEY OF DIESELS AND TABULATION OF PERFORMANCE STATISTICS

In view of the conditions it appeared impracticable to collect complete information and it was decided to forego the statistics until such time as we can again obtain complete and satisfactory replies to questionnaires on this subject.

STANDARDIZATION

To date the subcommittee has studied the matter of standardization of trucks and truck parts of switching locomotives only. It has been developed that the biggest obstacle to complete standardization of the trucks is the traction motor, both as to its physical dimensions and the relationship between the axes of the armature shaft and the axle. Due to the restrictions placed upon the builders of locomotives by W. P. B., it was manifestly impossible to make any material progress during the past few years. The sub-committee, however, proposed to have available for immediately after the war a set of standard trucks complete with traction motors for 44-ton, 600-hp. and 1,000-hp. switchers. To accomplish this the sub-committee will co-operate with a committee on this subject of the A. I. E. E. in an effort to provide a suitable standard traction motor which can be used interchangeably in all locomotives of the above-mentioned fundamental sizes.

There are no fundamental differences in the truck arrangements now used on the 44-ton locomotives generally in use, nor on a considerable number of the 600- and 1,000-hp. locomotives which would prevent the complete standardization with interchange-ability of all principal parts. In fact, three of the larger manufacturers of 600- and 1,000-hp. locomotives now use fundamentally the same truck with such modifications as are required for the motor-nose suspension brackets and the openings for the traction-motor blower ducts. A third large manufacturer uses different trucks, but there is sufficient room in the truck now under consideration to permit installation of this builder's traction motors. It appears, therefore, that there should be no difficulty whatever in designing traction motors with the same general dimensions of the case so that motor-nose suspension brackets will be identical, with identical distance between the center of the armature shaft and the center of the axle, and identical arrangement of the traction-motor blower duct attachment to the truck transom.

The standardization of axles for the 600- and 1,000-hp, locomotives presents no serious problem and the truck can be so arranged that railroads who so desire can use the special journal boxes and bearings developed by one manufacturer of journal boxes and at present used on a rather considerable number of locomotives of these types.

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CLASSIFIED REPAIRS FOR DIESEL LOCOMOTIVES

The sub-committee has been requested to outline a system of classified repairs for Diesel locomotives. At the present writing there seems to be considerable difference of opinion as to the necessity for classifying Diesel repairs since a number of railroads are making such repairs currently on a unit-exchange basis, changing out traction motors, wheels and axles, complete trucks, as well as complete power plants as the occasion demands and in this way keeping such locomotives out of service the minimum length of time. However, for such roads as may desire to classify repairs on this type of motive power, the sub-committee will attempt to draw up a procedure which can be submitted as recommended practice.

RATING OF LOCOMOTIVES

In cooperation with the Electrical Section, the sub-committee is attempting to draw up a standardized rating of locomotives of all types so that a direct comparison of horsepower can be made between steam, internal-combustion, and electric locomotives. Preliminary meeting of the joint sub-committee has been held but to date only a rough outline has been prepared of a proposed standard rating form to cover the various types of locomotives. This, when completed, will be submitted to the appropriate committee of the Electrical Section and the Locomotive Construction Committee for review before it is finally submitted to the member roads.

The sub-committee chairman is A. G. Hoppe, who is assistant chief mechanical officer of the Chicago, Milwaukee, St. Paul & Pacific.

Design of Dry Pipes and Steam Pipes

In 1943 there was submitted to letter ballot for adoption a list of sizes of steel or iron tubing to be used for making dry pipes for steam locomotives. This list, which was approved by letter ballot, included sizes of tubing suitable for dry pipes applied between the throttle and superheater of the locomotive and, there-

Dry Pipes and Outside Steam Pipes

RECOMMENDED PRACTICE
ADOPTED 1922; REVISED 1943, 1945

Sizes shown in table below cover recommended sizes of wrought-steel or wrought-iron tubing for dry pipes and outside steam pipes.

Standard dry pipes for locomotives

Dry pipes without pressure

in.	Average thickness of wall, in.	Outside diameter, in.	Average thickness of wall, in. .250					
3.5	.220	9	.250					
5	.240	10	.313					
6	,280	11	.313					
7	.313	12	.313					
8	.344	14	.312					
9	.375		*** 1					
10	.438		***					
11	.500							
12	.500							
14 .	.500		4.5.5					

Steel A.S.T.M. Specification A-106.
Wrought iron A.S.T.M. Specification A-72 or standing tubing to recognized manufacturers' specification.

fore, subject to external pressure tending to collapse the pipe. Throttle valves located between the superheater and the cylinders of locomotives are now common. Therefore, an additional list of dry pipe sizes for pipes that are not subject to external pressure is recommended. Recommended changes in page F-6A of the Manual are shown to include these additional sizes. Also included is a 14 in. size in the standard dry pipes for locomotives with pressure.

The subcommittee chairman is D. H. Kueck, assistant chief mechanical officer, Missouri Pacific.

Globe and Angle Valves for 300 lb. Pressure

During the past year the Committee had some complaint that the design of the hand wheel as shown on page F-171 of the Manual is not entirely satisfactory because the circular shape and smooth contour does not provide a good grip, and is especially slippery when handled with oily gloves.

The Committee is studying the matter, but to afford a remedy in the meantime, it is recommended that the note at the bottom of page F-141 be changed to read as follows:

Note: Hand wheels may be the manufacturer's standard or as specified by the purchaser, provided they properly fit the stem of the standard valve.

The subcommittee chairman is J. E. Ennis, engineering assistant, New York Central System.

Boiler and Firebox Materials and Construction

The 1941 report on locomotive boiler and firebox material and construction showed information obtained by questionnaire to railroads and three builders.

After study of this information, the committee submitted the following recommendations:

ASSEMBLY AND WORKMANSHIP

Boilers should be assembled as free from fabrication strains as possible. This requires that all component parts, particularly the shell courses and connecting sheets be assembled in a work-manlike manner, in order to be free of stresses after riveting is done. Any other procedure will impose unnecessary stresses on parts and contribute to ultimate failure in service and high maintenance costs.

THICKNESS OF TUBE SHEETS

Thickness of tube sheets should be sufficient to provide the required strength without sacrificing necessary flexibility and heat transfer. Heat transfer is, of course, more important for the firebox tube sheet than for front tube sheet, but flexibility is equally important for both. In order to meet the requirements of strength, flexibility and heat transfer, the following thicknesses of tube sheets are recommended:

Front tube sheet to be ½ in. on boilers under 75 in. in diameter and ¾ in. on boilers over 75 in. in diameter.

Firebox tube sheet to be $\frac{1}{2}$ in, thick for boiler pressures up to and including 300 lb. per sq. in.

The radius of front tube-sheet flange should be not less than 1 in. and not more than 2 in.

The radius of the back tube sheet flange should not be less than $\frac{3}{4}$ in. with riveted construction and $\frac{11}{4}$ in. with welded construction. The minimum space between the side of the tubes and inside of crown sheet should not be less than $\frac{21}{2}$ in. and space between side of tubes and inside of side sheets should not

be less than 11/2 in. This distance is based on a 1/2-in. tube

sheet with 34-in. radius. If these dimensions are increased, the

space between the tubes and sheets should be increased accordingly. It is preferable to hot-flange sheets and they should be annealed to relieve internal stresses and restore the strength of material after flanging.

THICKNESS OF BOILER ROOF SHEETS

Maximum allowable working pressure for any thickness of roof sheet to be computed by the following formula:

$$P = \frac{TS}{FS} \times \frac{tE}{R - \Sigma (s \times \sin \alpha)}$$

where:

P = maximum allowable working pressure, lb. per sq. in.

TS = ultimate strength of material, lb. per sq. in.

FS = factor of safety.

t = thickness of roof sheet, in.

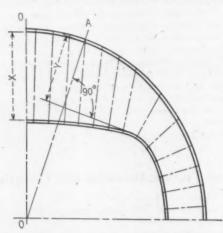
E = minimum efficiency of roof sheet through joints or stay holes.

R = radius of roof sheet, in.

a = angle any crown stay makes with vertical axis of boiler.

s = transverse spacing of crown stays in crown sheet,

Σ(s × sin α) = summated value of transverse spacing s × sin α for all crown stays considered in one transverse plane and on one side of vertical axis of boiler.



The above formula applies to the longitudinal center section O-O (Fig. 1) of the roof sheet, and in cases where E is reduced at another section O-A, the maximum allowable working pressure based on the strength at that section may be increased in the proportion that the distance X from the roof sheet to the top of the crown sheet at the center bears to the distance Y, measured on a radial line OA through the other section from the roof sheet to a line tangent to the crown sheet and at right angles to the radial line OA, or

$$P_{max.} = P_{OA} \times \frac{X}{Y}$$

where

 $P_{OA} =$ maximum allowable working pressure based on strength at section O-A.

RATE OF INCREASE IN WIDTH OF WATER SPACE

To provide sufficient space for circulation and release of steam, it is recommended that fireboxes be designed so that the rate of

increase in the width of water space will be as follows: (a) adjacent to the firebox tube sheet, not less than .5 in. per ft.; (b) near the firebox door sheet, not less than .3 in. per ft.

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SPACE BETWEEN CROWN SHEET AND ROOF SHEET

The capacity of the locomotive boiler is limited by its diameter because this determines the gas area of the flues through which all the gases of combustion must pass; in addition it must provide space for the superheater through which all the steam generated must flow. It determines the flue heating surface that can be installed per unit length of flue, the area of the steam-disengaging surface, and the steam volume above the water level in the boiler. This last item is of the greatest importance, and is, in reality, the limiting factor in high-output operation to prevent water carry-over into the superheater and cylinders.

In order to provide proper area for steam release and volume without unduly restricting boiler capacity, the space between the crown sheet and the roof sheet at the firebox tube sheet should be not less than .30 D nor more than .35 D, where D represents inside diameter, first course.

THREADS ON FIREBOX END OF RIGID RADIAL STAYBOLTS

It is recommended that threads on the firebox and of rigid radial staybolts, if tapered, be tapered 1½-in. in 12.

The subcommittee chairman is F. E. Russell, chief mechanical engineer, Southern Pacific.

Report of The Committee on Wheels



Shop inspection discloses conditions requiring extension of mandatory provisions of Section XX of the Wheel and Axle Manual

C. B. Bryant,*
. Chairman

In view of the unusual conditions this report is confined to items of unusual importance on those requiring letter ballot or other formal action.

During August, 1944, the committee authorized the manufacture of 150,000 chilled-iron wheels of 750 lb. nominal weight and 50,000 chilled-iron wheels of 850 lb. nominal weight, according to the so-called 1942 design submitted by the Association of Manufacturers of Chilled Car Wheels under date of August 14, 1944. This design incorporates changes in the contour of the flange and in the flange-supporting brackets which should materially reduce flange failures. The design was first cleared with the Track Committee of the Engineering Division. The wheels are to be marked "AAR-X" for identification.

Continuing its study of service behavior of chilled-iron wheels, the committee has arranged to collect data on wheel failures by questionnaires sent to a selected group of railroads. As a consequence of these studies, certain changes in the interchange rules have been recommended which will tend to restrict the use of the single-plate non-bracketed design of wheels. These changes were submitted to the membership in Letter Ballot Circular DV-1087, dated May 21, 1945. The studies are continuing.

The matter of maximum carbon in wrought-steel wheels with reference to question of relationship of high carbon to wheel

^{*} Assistant to vice-president, Southern.

tailures has been under study and factual data secured from a selected list of member railroads. This survey indicates the majority of wheel failures on untreated wheels to Specification M-107 are in the upper carbon range. It is recommended that the requirement for carbon content shown under Paragraph 5-Chemical Composition of Section II in Specification M-107 be reduced from the present range of 0.87-0.82 per cent to a range of 0.65-0.77 per cent; also, that Paragraph 8(b) of Section III in the specification be modified by eliminating the underscored portion as shown below:

8(b) When so specified in the purchaser's order, wheels of each type and rough bore diameter shipped in any one carload lot shall be so selected as to permit mating and mounting within a five-point carbon range according to the carbon content stamped on the wheels, i.e., 67-72, 68-73, 69-74, 70-75, etc., the preferred

group ranges being from 70-75 to 75-80.

These modifications have the concurrence of the Committee on

Specifications for Materials.

In order to provide a wheel circumference gauge suitable for use on larger sized wheels, a new gauge covering wheels from 38 to 52 in. in diameter has been authorized subject to letter ballot approval.

An extensive revision of the Wheel and Axle Manual was undertaken during the year and those changes requiring formal approval by the membership have been submitted to letter ballot. In the annual report dated May 23, 1944, the appointment of

a qualified inspector by the association to check wheel-shop practices was suggested. During the intervening year this work has gone forward and the inspection has been effective in disclosing practices requiring improvement. . Some of the conditions disclosed have indicated the necessity of strengthening and extending the mandatory requirements of Section XX of the Wheel and Axle Manual, Letter Ballot DV-1087 covers the changes recommended by your committee. These charges will facilitate the improvement of wheel-shop practices.

Material Specifications



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Changes proposed in several standard material specifications — Annulments of emergency specifications recommended

T. D. Sedwick,*

The committee has given consideration to the annulment of certain emergency specifications as would be desirable and permissible at this time in view of the revocation by the War Production Board of certain schedules of Limitation Order L-211 Consideration has also been given to changes and revisions of certain standard specifications and the following recommendations are submitted:

Carbon-Steel Axles

It is recommended that the annulment of emergency specifications E. M. 101-42, for carbon-steel axles for cars and locomotive tenders in view of W. P. B. revocation of Schedule V to L-211, also the following revisions of standard specifications M-101-41, be submitted to letter ballot.

Revise Sec. 1 (b) as follows: Three grades of axles are provided including: Grade A-as-forged axles up to and including those 61/2-in. nominal diameter at the center; Grade B-annealed

* Engineer of tests, Chicago, Rock Island & Pacific.

axles of any size; Grade C-normalized and tempered axles of any size. Freight-car axles over 61/2 in. diameter at the center shall be furnished in this grade.

Change "Paragraph" to "Section" in Sec. 13, 14 and 15 (d). Sec. 20 (b)-If any test specimen fails because of mechanical reasons, it may be discarded and another specimen taken.

Add new Par. (a) in Sec. 22, and move others down from

(a) and (b) to (b) and (c):-

Sec. 22 (a) If the results of the physical tests of any test lot do not conform to the requirements specified because a flaw developed in the test specimen during testing, a retest shall be allowed if the defect is not caused by ruptures, cracks, or flakes

Sec. 22 (b) present (a)—Change Par. 18 to Sec. 18.

Sec. 22 (c) present (b)-Change Par. 18 to 21 to Sec. 18 to 21.

Sec. 23 (a)—Change the last line to read "dimensions shown in Sec. D of the Manual."

Rewrite Sec. 27 (a) Axles which do not have black collars shall be legibly stamped with letters and figures not less than 1/4 in. high, in the location shown in Fig. 6. (b) Axles having black collars may have the same information stamped on the collar with letters and figures not less than 1/4 in. high. In this case, the requirement to finish turn one end of the axle for stamping may be disregarded.

Fig. 6 to be revised so as to omit Notes 2 and 5.

Forgings

Specifications have been prepared, embracing in one specification, only, carbon-steel forgings, annealed and unannealed, normalized and tempered, and quenched and tempered, and in another specification alloy-steel forgings, normalized and tempered, and quenched and tempered. These two specifications are intended to replace standard A. A. R. specifications M-102 and M-104, and reference to A. S. T. M. specifications A-236 and A-238 in the association's standards.

(The two recommended specifications are shown as Exhibit A. Spec. M-126-45 for carbon-steel forgings and Exhibit B, Spec. M-127-45 for alloy-steel forgings. These two exhibits, also Exhibits C to H, incl., prepared by the committee are not included, for lack of space, in this abstract of the committee's

report.-Editor.)

Both of these specifications have been submitted to the Committee on Car Construction and the Committee on Locomotive Construction, and a majority approval was received from both committees. Comments received from one member on each of the committees mentioned have been thoroughly analyzed, and it is felt that the specifications as written are clear as to intent, and that forgings complying with their requirements will be fully satisfactory.

Blooms, Billets and Slabs for Forgings

It is recommended that the question of rescinding Spec. M-105-41 and emergency Spec. E. M. 105-42 for blooms, billets and slabs for forgings be referred to letter ballot of the members. This recommendation is made for the reason that the A. S. T. M. specifications referred to in emergency Spec. E. M. 105-42, have been nullified by that society, and the requirements of our present standard specifications, M-105-41, are such that it is desirable that they be revised to broaden the scope of the specifications, and incorporate additional desirable requirements.

It is, therefore, recommended that, until new A. A. R. specifications can be prepared, with up-to-date requirements, there be shown in the A. A. R. Manual a sheet identified as M-105-45,

Exhibit C.

It is recommended that annulment of emergency Spec. E. M. 106-42, for steel tires, locomotive and car, permitted through revocation by W. P. B. of Schedule 11 to L-211, be approved.

Reference to A. S. T. M. Spec. A-53-42 covering furnacewelded, electric-resistance-welded and seamless-steel pipe should

be changed to A. S. T. M. Spec. A-53-44.

It is recommended that annulment of emergency Spec. E. M. 112-43 covering carbon-steel bars for railway springs be approved. It is further recommended that standard Spec. M-112-42 be modified by adding requirements shown in emergency Spec. E. M.-112-43, covering flat spring-steel bars, over 6 in. to 8 in. inclusive, to the table in Sec. III.

To bring the requirements of Spec. M-115 for boiler and fire-

box carbon steel up to date, and to include available classes of this grade of steel, the specifications have been revised, and it is recommended that the revised specifications, Exhibit D, be submitted to letter ballot of the members.

The physical requirements of the usual grades have not been changed; however recognized tensile requirements for carbonsilicon steel have been added, and the chemical compositions have also been brought in compliance with present recognized practices.

It is further recommended that annulment of emergency Spec. E. M. 115-43, permitted through revocation, by the W. P. B., of

Schedule 8 to L-211, be approved.

It is recommended that the following be submitted to letter ballot of the members: (a) Annulment of emergency Spec. E. M. 116-43, as permitted through revocation, by the W. P. B., of Schedule 8 to L-211: (b) Modification of standard Spec. M-116 covering structural-steel shapes, plates and bars, as follows: Sec, II. Chemical Properties and Tests, Par. 5. Check analyses may be made by the purchaser from finished material representing each melt. The chemical composition thus determined shall not exceed the requirements specified in Par. 3 by more than 25 per cent. The specifications are otherwise to remain the same as now printed.

It is recommended that the following be submitted to Letter Ballot of the Members: (a) Annulment of emergency Spec. E. M. 117-43 covering steel sheets and thin plates, as permitted through revocation, by the W. P. B., of Schedule 8 to L-211; (b) Revision of standard Spec. M-117, as follows: Sect. II. Chemical Properties and Tests, Par. 5, Check analysis—An analysis may be made by the purchaser from finished material representing each melt or lot of ten tons. The carbon, phosphorus, and sulphur content thus determined shall not exceed that specified in

Sec. 4 by more than 25 per cent.

It is recommended that annulment of emergency Spec. E. M. 124-42 covering heat-treated tires for cars and locomotives permitted through revocation by the W. P. B. of Schedule 11 to L-211, be approved.

Steel Castings

To bring M-201-36 and emergency Spec. E. M. 201-42 for steel castings up to date, and broaden its scope so as to take advantage of improved present day practices, new specifications have been drafted, and are identified as Exhibit E.

These specifications have been submitted to the Committee on Car Construction and the Committee on Locomotive Construction, and a majority approval was received from both committees. Comments received from one member of each of the committees mentioned have been thoroughly analyzed, and it is felt that the specifications as written are clear as to intent, and that castings furnished in compliance with the requirements of these specifications would be fully satisfactory.

It is recommended that annulment of emergency Spec. E. M. 201-42, and revision of standard Spec. M-201-36 be submitted to letter ballot of the members.

Malleable-Iron Castings

To provide for the use of an alternate test specimen to be permitted under A. A. R. Spec. M-402, for malleable-iron castings, it is recommended that Par. 5 (first sentence) be changed to read as follows: Test Specimens.—(a) Tension test specimens can be of the form and dimensions shown in Fig. 1 or Fig. 1-a. (design of alternate test specimen, attached, identified as Exhibit F, should be shown below Fig. 1 on page 2 of specifications, and designated as Fig. 1-a).

Emergency Spec. E. M. 601-44 for air brake and train air signal hose have been revised to include a cover made of Neoprene rubber. The revised emergency Spec. E. M. 601-45, shown in Exhibit G, are recommended for approval.

It is recommended that specifications for rubber goods, general instructions on standard methods of tests be covered by including in the manual emergency Spec. E. M. 607-45, Exhibit H.

In accordance with practice of reviewing specifications in effect for five years, without change, it is recommended that Spec. M-908-34, covering paper, insulation, for refrigerator cars, be reaffirmed.

As general information, the various laboratories represented in the Committee on Specifications for Materials, are presently carrying out some cooperative investigations of various items,

particularly in connection with age resistance tests of synthetic rubber, Buna S and Neoprene, for cover of air-brake hose, brakecylinder lubricants, etc.

Brakes and Brake Equipment



Better control of maintenance of K triples and AB parts provided for— Braking ratios of low gross-to-tare cars revised each

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I. P. Lantelme, Chairman

In order to eliminate reports of lubricator swabs coming out of place on AB brake-cylinder pistons, the air-brake manufacturers have improved the design of this lubricator swab by increasing it to double its depth and eliminating the use of the expanding

This change does not effect the interchangeability of any part of the brake-cylinder assembly, nor does it change the price of

the piston lubricator.

Maintenance of Freight Air Brakes

A thorough investigation had revealed a number of mechanical variations from standard in the triple valves and test racks, which had an influence on the operation of K valves. Instructions were sent to all concerned calling attention to the importance of inspecting and gauging the various parts of the K valve; also, in order to provide more restrictive tests for the K valve on the test racks, several modifications were made in the Code of Tests (Instruction Pamphlet No. 5039-1) such as: (a) Reducing the maximum allowable resistance in the piston alone and in the piston and slide valve combined; (b) reducing the maximum allowable ring leakage; (c) making the service stability test more restrictive.

These changes were placed in effect September 1, 1944, and if adhered to will result in a reduction of reports of undesired

brake applications on freight trains.

Also, to provide more restrictive limitations in the maintenance of the AB valves, the use of the following gauges was recommended, effective September 1, 1944: (a) Gauge for small serviceand emergency-piston bushings; (b) gauge for the small diameter of the service and emergency pistons; (c) gauge for the diameter of the emergency-piston bush and selecting proper size rings; (d) gauge for the diameter of the service-piston bush and selecting the proper size rings; (e) gauge for the accelerated-release piston; (f) gauge for the vent-valve-piston bush and selecting proper size rings.

Tests of D-22 Valves

Progress is reported in tests of D-22 valves for improved H. S. C. brake equipment on passenger cars and Diesel-electric locomotives. The total number of failures reported to April 30, 1945, on test cars was 104, including failures of the following detail parts: Relay B21, 12; relay F, 10; relay A, 2; D-22 service portions, 11; D-22 emergency portions, 5; slack adjusters 62; brake cylinders, 11; reservoirs, 1; seals broken, 3. Up to April 30, 1945, 28 cars have been reported for 18-month tests.

From this report it will be noted that while the total number of failures of slack adjusters are highest, it must be remembered that there are four slack adjusters and four brake cylinders to

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Rallway Mechanical Engineer AUGUST, 1945

[&]quot;General foreman, office mechanical engineer, Pennsylvania.

each car compared with one of any other unit. This is submitted for information and a complete report will be prepared after the three-year period with the committee's recommendations.

We also wish to record our appreciation for the assistance given by various manufacturing companies on subjects jointly discussed with them, also for the use of their laboratory facilities.

Corrosion of Air-Brake Equipment

The committee, in conjunction with the air brake manufacturers, has been making continuous studies since 1939 of various ways and means to reduce or eliminate the corrosion of air-brake parts, especially on refrigerator cars, where in many cases the parts had to be removed before the expiration of the air-brake cleaning date.

In the early stages of the study of corrosion-resistant paints, the manufacturers established that it would be necessary to discard the use of paraffin for treatment of castings. This was for the reason that paints of the type that were found to be best suited for the purpose, could not be used on a paraffined surface. In their research for a substitute for paraffin for treating castings they located a new material that on a thorough trial proved to be superior to paraffin both from a rust-resisting standpoint and a base for paint.

The air brake manufacturers have already changed over to this new treatment for all brake castings.

With the new basic treatment for castings they were then in a position to change over from the present standard paint to a more resistant paint. They have definitely established what materials are required in a paint having high rust-resisting characteristics, and as soon as the materials are available they plan to use them.

In the meantime they have found a substitute paint that tests show to be superior to the paint they are now using, but of course, not as good as the paint they will ultimately use; however, not to defer changing over to the ultimate paint they have decided to use the substitute paint to take advantage of the improvement that can be secured.

The manufacturers advise that this change will not increase the cost of the brake equipment.

Cleaning, Testing and Lubricating AB Brakes

Due to prevailing conditions, including the impossibility of taking cars with experimental AB brakes out of service for test and the increasing number of these cars reported for being inoperative, the reports of which do not give complete information, it was agreed that a letter be sent to member roads requesting that brakes on these cars be given periodic attention. Circular DV-1082, dated February 15, 1945, was issued requesting that these cars be given air-brake attention in accordance with Interchange Rule No. 60, furnishing the additional information shown in the circular. After all these cars have received this air-brake attention, a complete report will be submitted.

Braking Ratios for Tank Cars

Consideration has been given to the braking ratio for tank cars of heavy construction having high lightweights and used to transport the lighter petroleum fractions. In order to include in the present braking power requirements certain classes of cars having an exceptionally low gross-to-tare ratio, it was recommended that a revision of the last two paragraphs on Page E-12 of the A. A. R. Manual, be made as shown below and recommended as a ballot item.

Proposed Form: On and after January 1, 1946, all freight cars offered in interchange having single-capacity brakes shall have a nominal braking ratio of not less than 50 per cent nor more than 75 per cent of the empty-car weight, based on a brake-cylinder pressure of 50 lb. per sq. in., except refrigerator cars which shall have a nominal braking ratio of not less than 50 nor more than 60 per cent of the empty car weight, based on 50 lb. per sq. in. brake cylinder pressure. Adopted, 1913; Revised, 1938, 1945.

It is also recommended that Par. (b-9) of Interchange Rule 3

be revised accordingly.

In addition to the above, the following items are among those under active consideration by the committee: (a) Test code for single car test device; (b) charging test for AB valves on repair tracks; (c) gauges for AB valves; (d) standard location for release valve handles; (e) automatic blow down for freight-car release valves.

Couplers and Draft Gears



Coupler reclamation practices under close scrutiny -Development of an interlocking type freight coupler is now under way

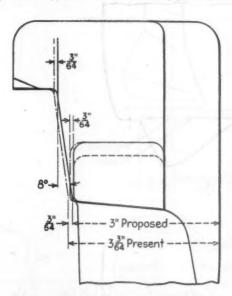
> H. W. Coddington,* Chairman

During the year the committee held two meetings, a portion of each meeting being in conjunction with the Coupler Manufacturers Mechanical Committee that consideration might be given to problems of mutual interest.

One circular letter was directed to the members and private car owners during the year, dated August 10, 1944, relating to the abusive treatment of draft keys resulting from the indis-This letter was accompanied criminate use of the cutting torch. by photographic illustrations of the conditions observed on a member road.

Draft-Key Retainers

It is the opinion of the committee that the inspection of draftkey retainers in transportation yards would be improved if all draft keys were applied from the brake pipe side, since when

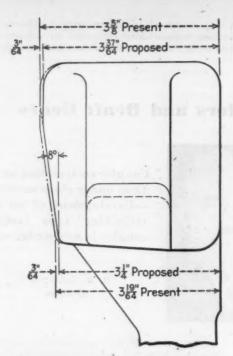


Proposed changes in the thickness of the T-type tightlock coupler lock to permit seating on the knuckle-tail shelf

keys are applied from the opposite side the brake pipe interferes with clear vision of the retainer and the accompanying cotter.

In addition to improving the inspection facilities of the draft key retainer, when keys are applied as suggested, the brake pipe in many instances would serve as a retarding influence should the retainer be missing. Should the key continue to work out

^{*} Research and test engineer, Norfolk & Western.

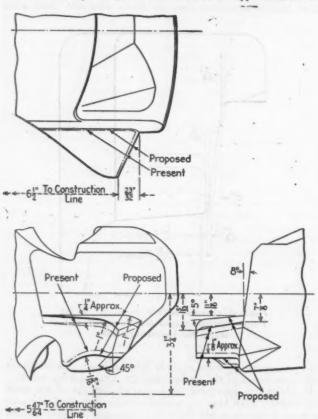


Proposed changes in the thickness of the Type H tightlock coupler lock to permit seating on the knuckle-tail shelf

there is a possibility of fracturing the brake pipe and causing application of the brakes under which condition the defective draft equipment would be detected.

In its meeting in Cleveland on May 3, 1945, the committee was unanimous in recommending to the Committee on Car Construction that draft keys be applied from the brake-pipe side in order to facilitate inspection of the draft-key retainer and cotter.

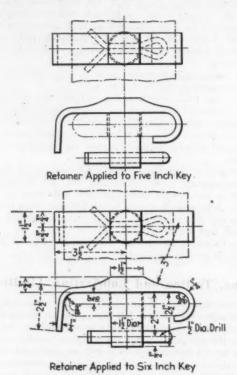
In the 1944 report mention was made of the appointment of a



Proposed changes in the lock shelf of the Type H tightlock coupler knuckle to permit seating of the lock

joint subcommittee of the Car Construction Committee and the Committee on Couplers and Draft Gears to evolve a more secure type of draft-key retainer. Investigation of the loss of retainers due to shearing of the cotter developed that this condition was occurring when the standard retainer would ride up on the shoulder of the outside cheek plates used with two- and three-key draft-gear attachments thus causing a shearing action against the cotter. Recognizing this condition the joint subcommittee presented for consideration a modified retainer in which a steel strap was welded to the top of the retainer head in such a manner that the strap could be bent around and under the edge of the draft key and thus prevent it swiveling into a position where the head would foul on the cheek plate. The Coupler Committee approved this suggested retainer and referred it to the Car Construction Committee.

A further development aiong this line is the modification of



A forged draft-gear retainer with elongated ends for turning under the key to prevent swiveling

the retainer shown in Fig. 2 of the 1944 report, and consists of a forged retainer with the ends elongated to the extent they can be turned under the draft key to prevent swiveling. This type of retainer also met the approval of the committee and was referred to the Car Construction Committee for its consideration.

Maintenance and Inspection of Draft Gears

In the early part of 1934, the Director of the Bureau of Safety of the Interstate Commerce Commission, stressed the importance of improving the condition of draft gears and attachments thus reducing the unresisted slack in the coupler and draft-gear assembly. At that time a member road represented on the committee made a check of 1,838 car ends and found that 18,7 per cent of the cars would require attention on the basis of the 1½-in. limit and 38.4 per cent on the 1-in. limit. At that time 1½-in. unresisted slack was set as a limit to be observed when cars were on the shop track and established as recommended practice in 1934 (see Plate L-142-1942 of the Manual of Standard and Recommended Practice).

A similar survey was recently made on the same road involving 3,095 car ends; this survey showed only 3.6 per cent over the 1½-in, limit and 10.4 per cent showed 1 in. free slack.

The committee, in considering this subject, recommends that 1 in. be adopted as recommended practice and Plate L-142-1942 be revised by reducing the present 1½ in. dimension to 1 in.

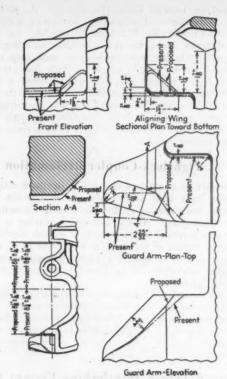
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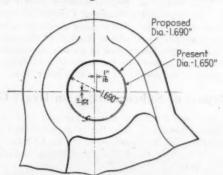
Proposed changes in the guard arm and alignment wing of the Type H tightlock coupler to allow for more guard arm distortion in service

Reclamation of Couplers, Knuckles, Locks, Etc.

During the year two items of reclamation have been presented to your committee for consideration. One was prompted by a report from the A. A. R. mechanical inspectors that they had found instances where parts of separate couplers, the shank of one coupler and the head of another, had been welded together to form a complete unit. While your committee recognizes that such an operation could be satisfactorily performed if properly supervised, it does not consider that a practice of this kind should be recognized or permitted under the Association's rules governing the reclamation of couplers and parts.

Another suggestion has been made that couplers be normalized at the time cars are undergoing heavy repairs.

The process of normalizing would be of value in overcoming a



Proposed change in the diameter of the pivotpin hole in the pivot lugs of the Type H tightlock coupler

condition of metal fatigue, but examination of broken couplers does not indicate that any appreciable proportion of these failures can be attributed to metal fatigue. Taking into consideration the fact that the coupler would have to be completely dismantled for the normalizing treatment due to the difference in composition of parts, and the questionable value that might be obtained from a general practice of this nature, the committee does not look with favor upon recognizing this as a suitable procedure to improve the shock resistance of the coupler.

Proposed Articulated Rotary Lever Assembly

A subcommittee of the Mechanical Committee of the Standard Coupler Manufacturers has been following the performance of the proposed articulated rotary lever assembly as applied to Atchison, Topeka & Santa Fe cars, but limited observations did not warrant a report of progress at this time.

The subcommittee has earnestly requested that members of the Coupler Committee apply from 25 to 50 car sets of this operating arrangement until some 200 additional applications are made so that the operation of the device can be observed under

more extensive and diversified service conditions.

At its meeting in Cleveland on May 3, 1945, the Coupler Committee authorized these additional applications with the understanding that the Mechanicl Committee would make the necessary arrangements directly with the railroads they may select and report the name of the railroad and the car number to A. C. Browning as the application on each road is completed.

Increased Yield Strength of Knuckles

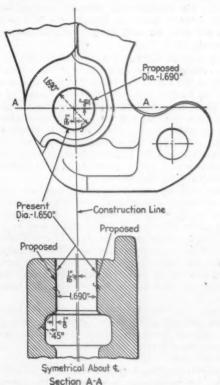
The Mechanical Committee of the Standard Coupler Manufacturers has for some time been investigating the possibility of increasing the yield strength of knuckles for standard Type-E and tightlock couplers in order to reduce the stretching and

breakage of knuckles occurring in service.

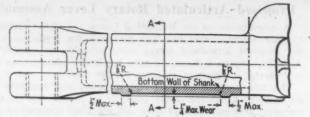
An important part of this problem is to keep the ultimate strength of the knuckle less than the ultimate strength of the bar as a protection against breakage of the bar. The development work has progressed to where the desired results have been obtained experimentally and a program of tests has been laid out and approved. The required material for these official tests is now in process and when available, arrangements will be made to conduct the tests under the supervision of the joint subcommittee representing both the Mechanical Committee and the Coupler Committee having in mind that when this program is completed suitable specifications will be developed.

Tightlock Couplers

During the past year the problem of sticking locks in tightlock couplers has been carefully investigated. Service experience has demonstrated that when the lock becomes seated on the shelf of the knuckle tail, sticking of the lock no longer occurs. The



The proposed change in diameter of the pivotpin hole of Type H and T-type tightlock coupler knuckles

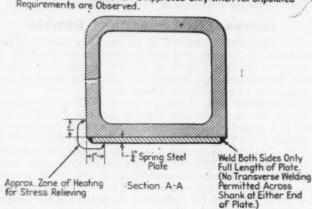


Shanks Worn from Contact with Carrier not in Excess of Amount Shown may be Restored by Machine Finishing Surface to Depth of £ and Welding in Place Spring Steel Wear Plate as Shown in Section A-A.
 Welding shall be Performed by the Electric Process, Using Shielded

Arc Electrode.

After Welding the Coupler Shank shall be Stress Relieved in the Vicinity of the Weld as in Section A-A at a Temperature of 400°C. (750°F) to 500°C (930°F) FAINT RED COLOR.

This Method of Reclamation is Approved Only when All Stipulated Requirements are Observed. 3



Method of reclaiming tightlock coupler shanks when worn from contact with the carrier

Mechanical Committee of the Standard Coupler Manufacturers recommends that when objectionable sticking of locks occurs in service, adjustments be made by reducing the thickness of the lock by machining or grinding the knuckle face of the lock an amount sufficient to lower the lock until it seats on the knuckletail shelf. The amount to be removed from the knuckle face of the lock depends upon the distance the lock seats above the knuckle tail shelf, the ratio being 1/64 in, for each 1/8 in. the lock is above the shelf,

The Mechanical Committee also recommended for new Type-H couplers, changes in the thickness of the lock and the height of the shelf on the tail of the knuckle to provide for seating of the lock on the knuckle-tail shelf or not to exceed 1/8 in. above the shelf. These changes were approved by the Coupler Committee with the understanding that the coupler manufacturers will continue to consider other possible means to eliminate sticking of locks and still retain the take-up slack feature This approval also included a reduction in the thickness of locks as manufactured for maintenance of T-type tightlock couplers modified in accordance with Circular No. 942-A.

Another improvement affecting the tightlock coupler was recently recommended by the Mechanical Committee and has been approved by the Coupler Committee. This change involves an increase in the diameter of the pivot pin hole in the pivot lugs of the Type-H coupler head, the Type-H knuckle and the T-type knuckle. Service experience has shown that the previous diameter of the pin hole was too small to accommodate satisfactorily the standard knuckle pin and to provide for proper fitting between the pulling lugs and buffing shoulders of the coupler head and

An improvement has been made affecting the interlock between the guard arm and gathering wing pocket to assure more satisfactory coupling between two type-H couplers even though the end of the guard arm of either or both couplers has been bent outward as much as 34 in.

All type-H couplers, knuckles and locks as well as knuckles and locks for maintenance to T-type modified couplers bearing cast date May, 1945, and later, will incorporate all the above

In February, 1943, the Committee on Couplers and Draft

Gears and the General Committee approved the modification of existing T-type tightlock couplers in accordance with Mechanical Committee Circular No. 942-A, which provides for changing to rotary operation, using the No. 6 coupler operating mechanism and incorporating the same principle of anti-creep arrangement as employed in the type-H coupler. With few exceptions, the railroads using tightlock couplers have initiated a modification program and have a considerable number of these couplers modified. The coupler manufacturers have improved conditions so that they are now in better position to supply the needed coupler and operating mechanism parts to keep these modification programs moving,

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Tightlock-Coupler Reclamation

A satisfactory method of reclaiming tightlock coupler shanks where they have been worn from contact with the carrier has been under consideration by the Mechanical Committee and the Coupler Committee, At the last joint meeting a reclamation practice was approved which consists of smooth machine finishing of the worn surface of the shank to a depth of 1/4 in. and welding into the recess thus formed a 1/4-in, spring-steel plate. reclamation procedure will be issued in the form of a circular for general distribution.

The Mechanical Committee is now preparing a new circular which will cover all recommended tightlock coupler reclamation practices, including that here described. It is intended to include also in this circular a complete guide to the proper maintenance of tightlock couplers. This circular when completed will be made available to all concerned.

Proposed Type-F Interlocking Freight Coupler

The subject of developing a postwar interlocking coupler for freight equipment is being progressed as rapidly as possible. joint subcommittee has been appointed to represent the Car Construction Committee, the Mechanical Committee of the Standard Coupler Manufacturers and the Committee on Couplers and Draft Gears. Several meetings have been held and definite progress has been made. As soon as a satisfactory design is agreed upon by the joint subcommittee, this design, together with a schedule of laboratory and road service tests, will be referred to this committee for consideration and appropriate action.

Tightlock Yoke for Use with Twin Cushion Draft Gear

A member road has suggested a design of short coupler yoke for use with Twin-Cushion draft gears which can be applied to a car with the standard A. A. R. 245% in. length draft gear This design has been considered jointly with the Mechanical Committee of the Standard Coupler Manufacturers and plans are now under way for making necessary laboratory tests to develop principally the column strength of the yoke under buff. This matter is being progressed as rapidly as existing conditions will permit, and appears to the committee as being a desirable design pending the results of the laboratory tests.

Report of Subcommittee on Draft Gears

There has been no change during the past year in the number of approved draft gears. The list of approved and conditionally approved gears will be found in A. A. R. Circular N. V. 1067, page 11, and also in the latest copy of the Interchange Rules under Rule 101.

During the past year authority has been granted for the application of 2.500 additional car sets of the gear, which is designated as Waugh Twin-Cushion Type WM 4-6. By this action the total applications authorized to date amount to 3,900 car sets.

Emergency Substitutions of Materials

The subcommittee has recently obtained specific information from the various manufacturers covering physical properties of substitute materials which are being used in certain certified gears during the present emergency because of government restrictions on the use of critical materials. In most instances the manufacturer proposes to return to the use of original materials as soon as they are again available and the subcommittee

Rallway Mechanical Engineer AUGUST, 1945

will require this in all cases unless it can be shown that the substitute materials are as good as or better than those originally specified.

Draft Gears Manufactured in Canada

As promised in last year's report, specimens of all certified gears manufactured in Canada were selected at random from railroad or car builders stocks by representatives of the subcommittee and shipped to the Association Laboratory at Purdue University for check tests. These tests have been in progress since last summer and should be completed soon, after which the results will be reported in due course. It may be stated at this time, however, that certain deficiencies have already been called to the attention of the manufacturers involved with the suggestion that prompt corrective action be taken. In each case these manufacturers have shown a disposition to cooperate willingly.

Report on Tank Cars



Work of the committee was kept up without a formal meeting but members were called upon to serve on sub-committees

F. Zeleny, Chairman

Since the last report, 232 dockets and applications for approval of designs have been submitted as follows: 87 covered designs, materials, and construction of 1,967 new shipping containers, for mounting on new cars or for replacement on existing cars; one application covered the construction of eight multiple-unit cars to be used for the transportation of 15 Class I. C. C.-106A-500 one-ton containers each; 126 applications covered alterations in,

* Engineer of tests, Chicago, Burlington & Quincy.

Eighteen Applications Requesting Approval of Tank-Car Appurtenances

Applications Tank-car appurtenances

1— Tanks fabricated of aluminum
1— Protective housing for manway cover fittings
1— Safety valve assembly for anhydrous hydrofluoric acid tank cars
1— Ton-containers of fusion-welded construction
3— Fusible plugs for ton-containers
1— Angle valves for liquefied petroleum gas tank cars
1— Gaging device for liquefied petroleum gas tank cars
1— Arrangement for sealing off heater systems
1— Modification of retest requirements for sulphuric acid tank cars
1— Substitute materials for Class I.C.C.-105-A series tank car manway cover studs and bolts
1— Procedure for reconditioning ton-containers
2— Revision of Fig. 8—Manhole covers for I.C.C.-104-A type and I.C.C.-105-A type tank cars
1— Method of securing safety appliances
1— Stuffing-box design for bottom outlet valve operating rods extending through dome

additions to, or conversions and reconditioning of 2,165 existing tank cars or shipping containers.

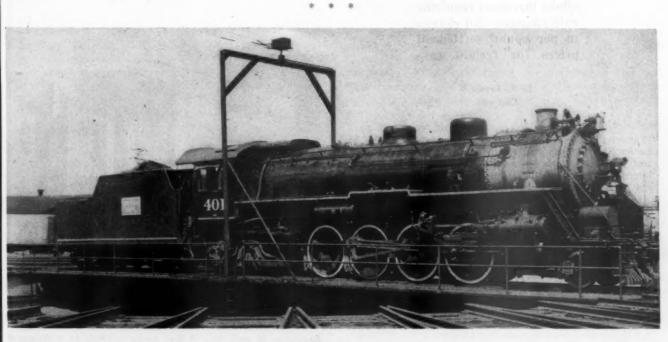
No reports have been received to indicate that any difficulties have been had in the continued use of B. & O. box car 390000, equipped with four steel-lined wooden tanks; B. & O. box car 390050, equipped with five corrugated-steel tanks; and 100 car sets of converted air-activated cement containers, in the transportation of authorized less-dangerous petroleum products.

Modifications of I. C. C. Regulations

Upon request of the Office of Defense Transportation, the committee and the Bureau of Explosives recommended to the Interstate Commerce Commission a modification of the latter's regulations to authorize the use of Class A. R. A.-IV and I. C. C.-104 tank cars converted and stenciled as provided in Sec. 303 (q) (1) for additional service transporting, inflammable liquids, under requirements suggested. The commission adopted the recommendation making it effective by suitable order.

Upon recommendation of the committee, the commission by appropriate order authorized the use of Class A. R. A.-IV and I. C. C.-104 cars lacking specification expansion domes, which had required renewal but were not replaced because of inability to secure materials promptly and of the urgent necessity for prompt return of cars to service, transporting 65 lb. liquefied compressed gas. The order required any such modified cars to have their specification markings supplemented by the term, "Emergency."

To meet an extreme emergency in the production of ordnance and aviation gasoline because of lack of sulphuric acid at certain plants producing the former, the Office of Defense Transporta-



Green Bay & Western Locomotive 401 is one of six 2-8-2 type locomotives which are averaging 9,000 miles a month in freight service between Kewaunee, Wis., and Winona, Minn.

Proposed Alterations, Additions or Conversions Affecting 2,165 Cars or Shipping Containers

or Shipping Containers

Alter for additional lading service
Anchorage changed from cast steel set-in type to single-piece riveted type
Bottom outlet removed
Conversion from A.R.A.-III general service to A.R.A.-III acid service
Conversion from A.R.A.-IV to A.R.A.-IV modified for 65 lb. liquefied
petroleum gas (Iso-Butane) service
Conversion from I.C.C.-103 to I.C.C.-103 insulated
Conversion from I.C.C.-103 to I.C.C.-103-B
Conversion from I.C.C.-104 to I.C.C.-104-A insulated
Conversion from I.C.C.-104 to I.C.C.-104 modified for 65 lb. liquefied
petroleum gas (Iso-Butane) service
Gaging device and protective housing installed.
Heater systems installed
Heater systems removed
Insulation and jacket installed
One-ton shipping containers reconditioned
Overhead unloading arrangement installed
Tank capacity increased
Tank lining installed

tion requested permission to use inflammable liquids cars in limited number, restricted service, and for a definite period to transport acid from its point of production, for not to exceed 25 miles, to the gasoline producing plants. The committee's recommendations for modification of the commission's regulations, concurred in by the Bureau of Explosives, to relieve the situation and authorize the use of readily available equipment without the necessity for its shopping and alteration, were made effective by the commission's order, dated January 25, 1945.

Upon recommendation of the committee and the Bureau of Explosives, the commission by its order of January 25, 1945, authorized the use of frangible discs having a 1/4-in. breather hole in the center thereof to be applied to safety vents of Spec. ICC-103-A tank cars assigned to the transportation of sulphuric acid, as specified, in order to promote safety.

While the committee as a whole has held no meetings since its last report on May 23, 1944, its members have frequently been called upon to serve on numerous subcommittees. These members' reports have been extremely helpful to the committee in disposing by correspondence of the various proposals, applications and dockets requiring its attention.

Committee on Prices for Labor and Materials

Prices of materials show slight increases requiring rule changes-No change in per pound settlement prices for freight cars

> J. D. Rezner,* Chairman

In order that the rules may currently provide an equitable basis for inter-road billing, your committee has continued the work of analyzing material, labor and new equipment costs in A.A.R. Interchange Rules 101, 107, 111 and 112 of the Freight Car Code, and Rules 21 and 22 of the Passenger Car Code, with a view of determining and recommending necessary changes to be made in the next supplement to the current code.

Rule 101

All miscellaneous material prices in Rule 101 were rechecked as of March 1, 1945, quotations submitted by the purchasing agents of the 10 selected railroads, representing 39 per cent of total freight car ownership in the United States and Canada, showing a slight upward trend in material markets as indicated by detail recommendations for revisions shown under this rule.

New Item 107-C is added to provide charge and credit for A.A.R. approved types of geared hand brakes.

Revised identification table for brake beams as recommended by the Committee on Car Construction, which eliminates obsolete

types of beams, is substituted for present Fig. 1 (page 205 of the 1945 code of interchange rules). References thereto in Notes 2 and 4 following Item 213 have been modified accordingly.

The item "Brake Wheel" in table of weights of miscellaneous items on page 210 of the current Code, is modified to indicate that wheels for geared hand brakes are not included.

Rule 107

Item 41 is eliminated and the wording of Item 98 modified to provide that R. & R. or R. of center pin is included in the allowances prescribed therein which is considered ample to absorb the go-get expense involved.

Item 114 is modified to eliminate conflict with Item 81.

Rule 112

No tank cars of classes 103, 103-A and 203 were built during 1944 and other types of freight cars constructed were considerably below the quantities on which per pound settlement prices have been established in the past. For this reason and because the cars were mostly built in small lots under prevailing emergency conditions with wide fluctuations in costs and also because material quotations during 1944 reflected only slight changes over the two preceding years, no change in per pound settlement prices for freight cars is recommended.

Passenger Car Rule 21

Item 20-K (slack adjusters) is modified to include necessary repair work and the allowance is increased accordingly.

Passenger Car Rule 22

Material price quotations were rechecked on the basis of quotations as of March 1, 1945, showing a slight upward trend, as indicated by detail recommendations for revisions shown under this rule, with the exception of service metal on wrought-steel wheels which reflects a slight decrease brought about by increase in scrap prices.

New Items 38-A, 39-A, 40-A, 41-A and 42-E are added to provide allowances for 21/2-in. steam train line parts and appurtenances, and Note 1 under Item 41 is modified accordingly.

It is the intent of the Committee to investigate material costs again in October and if sufficient change develops, necessary revision will be made and inserted in the Rules effective January 1, 1946.



Application of early type of Barr narrow vestibule to a Milwaukee coach (October 5, 1889) - J. N. Barr, superintendent of motive power, stands in the doorway

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A VACATION FOR ED*



No, suh! You done fixed it too good and it won't quit

THE big boss called Ed, the electrical editor, into the office and said, "Ed, you didn't have a vacation last year, if I remember correctly, and I've been thinking we might possibly arrange for you to get away a couple of weeks

this summer."
"Thanks," Ed said. "That would be nice. I sure would appreciate a vacation. I might even pick up a

little magazine material at the same time."

"Glad you mentioned magazine material," the boss said. "Of course you'll arrange material for the issue while you're away. Where do you plan to go on your

"Oh, I hadn't planned much," Ed said. "If it wasn't so far, I'd like to go to Colorado. Walt Wyre, you know, the fellow that does stories for us about Ned Sparks and Jim Evans, has a place in Colorado. He's invited me to come out there."

"Yes, I've read some of the Walt Wyre stories," the boss said noncommittally. "It might be arranged so you could have time to go to Walt's place. I understand it's not too far from Denver."

Walt Wyre

"That sure would be fine." Ed beamed and no one can do a better job of beaming than Ed, the electrical editor, when he is pleased.

"Well, that's settled," the big boss picked up a notebook. "I presume you had planned to go by way of Chicago and Kansas City."

'Hadn't figured any particular route; in fact, I didn't

know I would get to go anywhere," Ed reminded.
"That's as good route as any. Now while you're in Chicago, get in touch with Peters in our Chicago office and arrange to get a story at the Diesel electric plant at La Grange. While you're there it won't take long to run over to the Illinois Central and get something on their maintenance of electrified suburban trains. Spend a day or two in Chicago. We can use some good electrical ma-

terial," the big boss suggested pointedly.
"O. K., I'll do that and thanks for the vacation." Ed

rose and started to leave the office.

"Just a minute. There's been quite a bit of discussion about using higher voltage for train lighting and air conditioning, I understand. Might be a good idea to contact electrical men and get their ideas on the subject.

"That's right," Ed agreed. "Air conditioning has increased power demand considerably, making it necessary to use heavier wiring and batteries. Some electrical engineers are advocating 64-volt systems, some recommend 110 volts, others think 110/220-vols three-wire systems would be better and there are some who for various reasons do not advocate changing from the present 32 volt systems, which are most used.

"Well, get some material on the subject, not just opinions, but get facts and figures."
"I'll see what I can do," Ed fidgeted uncomfortably. Getting data complete enough to be of authoritative value on the subject of train voltages would require a lot more than a little casual questioning.

"Anyway, it's something to be working on and you might spend a little time in Kansas City around the terminal and at the waste reclaiming plant. It's over across the river on the Kansas side, I understand. That's all, I guess. You can figure on leaving about August first and you can take fifteen days."

ED SWALLOWED the groan that formed in his throat. Fifteen days! Eight days traveling, three days in Chicago, two days in Kansas City would allow just two days of actual vacation time. The beam on his face became a frown as he rose and left the office. Instead of at least ten days of fishing and loafing in the crisp mountain air as he had envisioned, prospects had faded to a long hard trip, maybe a night's rest and starting back.

Well, two days was better than none. Besides, it would be an opportunity to see a lot of new country and maybe

find a good place to vacation later on.

Between getting ready for the vacation and working up material for the magazine, Ed was busy as an ant at a picnic for the next ten days. His fishing tackle had not

^{*}In this story Walt Wyre turns his imagination on the editor to produce a mid-summer fantasy. When he writes about railroads he is sure of his facts.

been used for two years and some of it had been mislaid. His fly reel, the one that worked, had been loaned to an electrician the summer before and the electrician had neglected to return it. He found his fly rod, a book of flies, and a mess of hooks, then the tip joint of his fly rod fell on the floor and he stepped on it and broke it. Maybe Walt would have an extra tip, he figured, and packed the rod anyway.

By only wasting five or six hours out of each twentyfour for the next ten days, Ed managed to get everything in pretty fair shape for the next issue of the magazine and his things packed for the trip. A broad hint not too lightly dropped and the boss told Ed to go ahead and start on his vacation three days sooner than originally planned. He called the passenger station and asked

about getting a lower berth to Chicago.

"About two weeks after Labor Day," the agent said. "Business usually falls off a little about then. I might let you have an upper on one of the slower trains.'

O. K., if that's the best you can do. What time can

I leave?"

"Let's see," the agent said, "I can give you an upper on a tourist car leaving here at 6:15 tomorrow morning."

"I'll take it," Ed said resignedly.

Ar THE station Ed ran into Bill Johnson, assistant electrical engineer for the railroad. Bill suggested a cup of coffee and a doughnut. "The train hasn't been called

yet," Bill said.

The two men pushed through the crowd and finally found places in the coffee shop. A very disinterested waitress served them doughnuts that from their appearance and taste might have started out as synthetic rubber experiments with coffee that made them wonder if it came out of the coffee urn or kitchen sink.

In the meantime the train had backed into the station. Bill led the way through a side gate and the two got in ahead of the crowd. Bill knew the Pullman conductor and introduced him to Ed. "Take good care of him," Bill told the conductor. "Ed's a friend of mine."

After about two hours riding, Johnson said goodby to Ed and left the train. Ed, a short time later, started to the diner to get lunch, but started was all, the diner was full and a line of people extending well into the adjoining Pullman made prospects for lunching soon very slim. About thirty minutes later he went back. There was still a line, but shorter, and he waited. About twenty minutes later Ed reached the door. "Sorry," the steward said, "but the diner will be closed until dinner time.

On the way back to his seat, Ed met the Pullman conductor, who said, "Say, aren't you an electrician?"

"Well, I might be called an electrician," Ed grinned.

"I've worked at the trade."

"Well, there's something wrong with the lights in the next car back. If it wouldn't be asking too much for you to look at it-

"I'll look at it," Ed agreed, "but I don't have any tools

"The porter has a screwdriver and some pliers," the conductor said.

A blown fuse was the trouble in the car. When Ed put in a new fuse link, the lights were O. K.

"Thanks a lot," the Pullman conductor said.

time I see you in town, I'll buy you a drink."

"If you'll just tell me how to get a sandwich and a cup of coffee now I'll call it square," Ed replied.
"Oh, that can be arranged. I'll have the porter get you

"Fine," Ed beamed, "if you have any more electrical trouble, just let me know.'

He got the sandwich and coffee O. K., but it wasn't

long until he regretted his rash promise to take care of electrical trouble. The air conditioning in another Pullman quit and the conductor very tactfully reminded Ed that a man of his electrical knowledge and ability might be able to get it going in just a few minutes.

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Evidently there was something wrong with the thermostat circuit or relay because after checking all fuses, Ed short-circuited the test points and the apparatus started working. "When the car gets cool enough, better turn the air conditioning switch off," Ed told the conductor, "then when it begins to warm up, turn it on again."

"O. K., I'll tell the porter."

The smoking room was crowded and there was no lounge car. The porter started making up berths early and there being no place to sit, Ed climbed upstairs and to bed. He was dreaming of having a tug-of-war with a monstrous trout when he awoke, but it wasn't a fish doing the tugging, it as the Pullman porter.

"What's the trouble?" Ed asked sleepily.

"Sho' hates to wake you, Cap'n, but that air conditioning you worked on up the car ahead-" the porter

"Yes, what's the matter with it? Has it quit again?" "No, suh, dat's jes' de trubble. You done fixed it too good, an' it won't quit. I'se dug out all de extry blankets in de car an' de people is hollerin' for mo' blankets.'
"Did you turn it off?" Ed asked.

"No, suh, it's jes' like you left it."

"O. K., I'll show you how to turn it off." Ed looked at his watch-2:30 a.m. He climbed down and went to the Pullman. When he entered it felt like entering a frozen food locker plant. Ed turned the air conditioning off and explained to the porter about controlling the air conditioning with the switch, then went back to bed.

NEXT morning he was awakened by the noise in the crowded Pullman and trading his morning shave for a

place in line managed to get breakfast.

That evening when he reached Chicago, he found that Peters had reserved a room for him. It was too late to go to the I. C. terminal or out to the Diesel-electric plant. Next morning he met Peters at the office and they arranged to go to the Diesel plant that afternoon. The ranged to go to the Diesel plant that afternoon. assistant superintendent, very young and very cordial, insisted on going into minute details of every operation to such an extent that Ed was forced to go back next day to get the complete story. That afternoon he went to the I. C. and was more fortunate. He got the story there in short order.

Ed was planning to leave Chicago for Kansas City that night but when he went by the magazine office Woodward

handed him a wire from the big boss.

"Get story of special tools and equipment used to expedite locomotive repairs at Silvis."

Ed groaned as he saw another day vanish.

At the Kansas City passenger terminal Pearson was very helpful and he got the story in short order and still had time to catch an Argentine street car across the river. As he rode along above the acres of stock yards, Ed noticed that not many of the pens were filled with cattle, but the odor was strong enough to have come from the Augean stables before Hercules flushed them out. On by the soap factories, down by mule barns and boiler works the street car clanked and groaned until the tracks straightened out in Kansas City, Kansas.

It is about half a mile from the street car line to the shops where the "dope" reclaiming plant is located. walked because there was no other means of getting there available. He got the story and rushed back to town and, too late, remembered he had no hotel reservation. He took a taxi to the station. The taxi driver was a girl and she gave Ed a ride he'll not forget for a long time. She drove with reckless abandon as though all lights were green and no other cars or trucks on the streets. He called all the larger hotels first and received the same answer from each of them, "Sorry, nothing left." He finally got a taxi and went hotel hunting. At last he found a room in a place courteously called a hotel. He had a room on the second floor over a pool room evidently operated for the benefit of swing shifters. They played a little and talked a lot until almost daylight.

NEXT morning Ed went to the telegraph office. There was, as he had feared, a wire from the boss. "Are you getting material on car voltages," the message read. He tucked the message in his pocket and went to the pas-senger station. There he was fortunate and obtained reservation on the streamlined train to Denver.

The crisp cool morning air in Denver felt good and for the first time Ed felt as though he was actually on vacation. Luck was still with him and he found a nice room with a bath. After he had cleaned up a bit he called a taxi and went out to the Pullman yards. There he found a gang of the most versatile mechanics he had seen for some time. While Ed was talking to the foreman, he saw two men working on troop sleepers and kitchen cars. They changed out a set of batteries, the long life, non-rechargeable kind developed since the war started, put a new grate in a range, repaired the water system, fixed a broken bunk in a sleeper, repaired a faucet, then left to change a generator on a standard Pullman.

The foreman and Ed walked down by the string of cars that were being made ready for service, the foreman explaining how the cars were routed to reach a repair point as they needed servicing. When the foreman and editor returned the mechanics had the generator in place and were applying a new belt. Ed observed with interest the method used for getting the proper belt length. The generator was pulled up with a small rope block, then the belt was passed around the pulley rim, measured and cut. When the belt fasteners were riveted the belt slipped easily into place on the pulley, then when the blocks were loosened the belt had just the proper tension.

"Well, if you've seen all you care to see here, you might like to go over to the Burlington shops," the foreman said. "If you like, I'll take you over.

"Thanks," Ed said, "I'll be delighted."

Next morning Walt Wyre met Ed in Denver. After exchanging greetings, Walt said, "Hope you won't mind riding in a truck. I needed some things for my place and the tires on my car are so thin I was afraid to drive

"Not at all," Ed said, "riding in a cab of a truck should give me a good view of the scenery as we go along."
"You'll get a good view of the scenery, all right," Walt

told him. "If we get started right away we might make

my place by good dark."

The two men went to Ed's room and there sticking in the edge of the door was a well-known yellow envelope. The message was from the boss. "See Ray McBrian, might get some good material for magazine. Also see Whipple about Diesels working with steam locomotive helpers."

Ed groaned and called a taxi. "I'd advise walking if you are in a hurry," Walt said, "or else take a street car. The car line runs within about four blocks of the shops."

Ed had just about decided to either walk or take a street car when the taxi arrived. There were already three passengers in the cab to be distributed enroute. Ed saw quite a bit of Denver before the cab headed down Santa Fe Drive on the way to the shops.

It was almost three o'clock in the afternoon before Ed returned to the hotel. "Well, I guess we are ready to start," he told Walt. "Where is the truck?"

"In a parking lot about six blocks away," Walt replied. "You get your baggage while I get the truck and drive by to pick you up.'

When Ed saw the truck he understood what Walt had meant about being able to see out. The view was entirely unobstructed-no cab or top to spoil the view.

"Have you got an overcoat with you?" Walt asked. "It'll be pretty cold going over the mountain after the sun goes down.'

"No, but I've got a heavy shirt and sweater," Ed told

"Well, you'd better dig them out,"

About two hours after they left Denver they were well into the mountains. The old model truck Walt was driving coughed and rattled along. Ed thought every minute it would shed one of its flapping fenders, lose the radiator, the engine fall out of the frame, or all fall apart at once, but somehow it kept chugging along until Walt stopped to put water in the radiator. "Hold your foot on the brake," Walt cautioned Ed.

The road appeared practically level to Ed but when he eased up on the brake the truck started to roll backwards. "Look back and you'll get an idea how steep it

is," Walt told him.

Ed looked and saw the road they had just come over

several hundred feet below.

They reached the summit of the Divide just at dark; Ed wrapped in heavy shirt and sweater, was shivering with cold and stayed cold until they reached Walt's shack in the mountains.

"I'll warm the coffee and heat up a pot of beans," Walt told him when they entered the cabin. match? I'll light the lantern, then build a fire."

The brush burner stove soon was roaring and Ed thawed out and after a cup of warmed-over coffee, a plate of ditto beans, and some slightly stale bread, Ed was ready for bed.

You sleep over there." Walt pointed to a bunk made of pine poles with interlaced ropes for springs and a

straw filled tick mattress.

Despite the crude looking bunk, Ed was asleep almost immediately and didn't wake until he heard Walt chopping wood next morning.

The coffee was already warmed over again and the

beans were hot, so breakfast was ready.

"Where's the bathroom?" Ed asked.

"Down at the creek, if you want to wash your face," Walt told him. "Here's soap and a towel."

The water was cold as ice when Ed splashed gingerly and wet his face with the tips of his fingers.

After breakfast they smoked and talked awhile and

Ed mentioned fishing.

"Oh, yes, we'll go fishing, maybe this afternoon. This morning I want to work on a water power electric plant and I'd like some suggestions from you. I wanted to get it finished before you got here but didn't make it. Two of us working on it will get the job done pretty quick. Then when we get the house wired we can go fishing. The whole job won't take over three or four days.'

Two days later Ed received a message from the boss. "Go to Amarillo, Texas, soon as possible. Writing you

there.'

"Gosh, hate to see you leave before we get the wiring done," Walt said, "and I did hope we would get to go

"I had planned on a little fishing," Ed said. "Next time I think I will."

THE WHITE HOUSE WASHINGTON

June 7, 1945

Dear Colonel Johnson:

The transportation facilities of the nation are now called upon for the most gigantic task in all the history of transportation. The American armies must be moved from the victorious battlefields of Europe to meet and wipe out the tyranny of the East. In order to do this job most of our soldiers will be transported the full length of the American continent.

It required every transportation ingenuity to assemble our armies in Europe over a period of four years. This time the job is to be done in ten months. The contemplation of this task would overtax our faith if we had not found during the course of this war that the impossible has become our daily job.

I am asking you to extend my congratulations to all of cur transportation agencies -- and their millions of workers -on the results they have accomplished. At the same time express my confidence in them for the greater effort that lies

Sincerely yours

Honorable J. M. Johnson Director Office of Defense Transportation Washington 25, D. C.

For DISTINGUISHED SERVICE transportation I, as directed transportation by the President, present this to RAILWAY MECHANICAL ENGINEER

Office of Defense Transportation with my congrestulati

Railway Mechanical Engineer AUGUST, 1945

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EDITORIALS

President Truman Commends the Railroads

The letter from the White House reproduced on the opposite page was received by the editor of the Railway Mechanical Engineer with the following letter from J. M. Johnson, director, Office of Defense Transportation, Washington, D. C.:

"I am enclosing a letter from President Harry S. Truman, dated June 7, 1945, which expresses the President's appreciation of and faith in our wartime transportation. To this I have added my official congratulations.

"Your publication has well performed an important part in the war effort by informing those who supply and use transportation of its accomplishments and the difficulties which must be surmounted in meeting the national needs.

"For Railway Mechanical Engineer's service which I consider above the average and to each individual laboring in transportation who has, and will, perform such service, I add my sincere thanks to those of the President."

Director Johnson's opinion is a source of satisfaction to every person on the staff of this publication.

A Railroad Experimental Shop

At least one suggestion, advanced by F. K. Mitchell, assistant general superintendent of motive power of the New York Central, in a committee report prepared for the 1944 Year Book of the Locomotive Maintenance Officer's Association, deserves special emphasis due to its novelty and potential value in promoting improved equipment maintenance practices. Because most railway shops are long-established institutions in this country and have made enviable production and employment records in the past, there is altogether too great a tendency to assume that shop equipment and shop methods used by railroad men of an earlier generation are adequate today.

Quite the contrary is true and an alert shop supervisory force, whether engaged in locomotive or car maintenance work, is always on its toes to effect improvements which will increase either the quantity or quality of shop output. As a definite step in this direction, Mr. Mitchell's report suggests setting up a separate experimental shop, presumably at not less than one major repair point on each railroad, where new

shop tools, machines and methods can be developed, perfected and demonstrated, without interfering with the normal shop output.

In times like the present, when it is difficult to get the machines and manpower for repairing equipment as fast as necessary to meet war and civilian rail transportation requirements, probably little can be done towards getting these experimental shops equipped and in actual operation. It is not too early to start plans for at least the equivalent of an experimental shop and organization equipped to extract the best practices of progressive railroads, as well as other industries, and adapt them to local needs.

Obviously, the planning should also go far enough to project means for capitalizing fully on the work of the experimental shop on a system-wide basis, since the development of a thoroughly tested, checked and approved new method only initiates the real job of getting this method generally accepted and adopted.

Electrical Maintenance Of the Diesel Locomotive

With the increase in the use of Diesel-electric road locomotives there has been a corresponding growth of service and repair facilities. Road operating requirements are more severe than those of switching service and there are still in effect operating practices which take an unnecessarily heavy toll because traction motors are allowed to get too hot or to heat too quickly, causing relative movement between coils and core.

In the process of developing Diesel facilities each road using such power designs and builds a plant suited to its specific operating requirements and is usually guided by the recommendations of the manufacturer.

Probably the greatest variation of practice is to be found in the equipment used for electrical maintenance. This is caused by the fact that there are two schools of thought. One advocates doing as little as possible in a railroad shop, leaving major items such as rewinding to the manufacturer or outside service shop, and the other which wishes to keep all maintenance procedure under complete control of the railroad. For this reason, and because requirements are influenced by operating conditions, the plant installed by one road may not in detail be suited to the needs of another.

Basic needs are, however, common to all and these are covered effectively in a paper written for the American Institute of Electrical Engineers by N. J. Greene, D. E. Stafford and C. Gentilini of the National

Electric Coil Company. An abstract of the first part of this paper appears elsewhere in this issue. Such information should serve as a guide in determining what a railroad should do to meet its own requirements and what kind of tools and procedure are required to do the work. It offers no recommendation concerning the desirability of doing the heavy work in a railroad shop or having it done outside, but it serves effectively to show the importance of careful work and proper materials and methods. When all railroads have learned what operating and maintenance procedure will give them the best performance from their electrical equipment, Diesel maintenance costs will drop appreciably below their present level.

Safety Knows No Compromise

The mechanical condition of freight-car equipment has been getting steadily worse despite the best efforts of car-repair forces during the war years. This deterioration has been commented on from time to time in these columns, always with the expressed conviction that inspection and repair were still sufficient to insure safety in the operation of trains. Now many cars, not in safe operating condition, are in revenue service on the railroads, and unless measures are taken to remove them from service the trend in accidents caused by defective equipment is going to be upward.

Evidence to support this belief is available in any major classification yard today. That the situation is serious to the point of being critical can be further seen in the comment of one car-department head of many years' experience. It was to the effect that he would tie up his own railroad, and could tie up anybody else's railroad, by setting out all cars having A. A. R. defects. As matters are now, the inspectors try to catch the worst cars and hope for the best on the rest. With such a system, dependent on judgment as to the degree of danger involved in passing up defects, some bad risks are getting by.

A car-inspector foreman on another railroad stated that his policy had to be to shop cars only to the extent that the rip-track forces could handle them. His estimate was that, for all kinds of defects, his men could shop at least four times the number of cars that they did. Here, again, the policy was to try to catch the bad ones. The others moved as serviceable cars although many of them were as bad as the cars marked out. Almost every such supervisor faces similar situations and others have admitted informally that their procedures are about the same.

On still another railroad, a foreman car inspector estimated that he was sending home under the A. A. R. emergency order of May 10 relative to home shopping of cars requiring extensive body repairs, only one in eight of those which should be so handled. Such cars, of course, are rarely in good condition mechanically.

This is also true at other points and on other roads with estimates varying from one in three to one in ten.

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Some roads require all cars set out to be repaired and released within 24 hours. Others apply such a ruling only to loaded cars. It is safe to say that no car-repair point in the country today has the men or facilities to handle in any 24-hour period all cars that inspectors can mark out in the train yard. So, while the record report may be kept clear, some cars are going out lacking essential running-repair attention.

Hot boxes, resulting in burned-off journals, have been discussed within the past month with three different railroads in quite widely separated operating territories. One had had three in two weeks, another three in seven, the third, four in six. In one case on each of the first two roads, the cars involved were less than 12 hours off the repair track. With practically all roads experiencing an increase in hot boxes out of proportion to the usual and expected seasonal rise, more journals will burn off and more trains be derailed.

The car department is fighting, right now at least, a losing battle. No indictment of them is intended, however, in this recital of evidence of an existing and dangerous situation. It exists as a result of many circumstances which are essentially beyond their control. The important thing now is not to attempt to allocate or apportion blames. It is to stop attempting to compromise with safety.

Background Facts Are What Count Most

It seems to be characteristic of railroad executive officers, in the interest of efficiency and progress, periodically to call their operating and mechanical department men "on the carpet" and confront them with either operating records or maintenance cost statistics which have been made public by other railroads in the country, with the query, "Why can't we do as well as they can?"

Through all the years the steam locomotive has been operating it has been common practice to compare the maintenance costs per locomotive-mile; per thousand pound tractive-force-miles; or per thousand gross tonmiles for steam locomotives, with similar figures that have been or can be compiled in connection with the performance of neighboring roads. Fuel performance, also, is another very convenient basis upon which to ask mechanical and operating men those embarrassing questions as to "why some other railway can do better than we can." This continual comparison with the costs and performances of other roads, is without doubt a very worthwhile part of the routine of railroading, although we have always entertained the suspicion that the railroad officer who asks these questions knows the answers to them before they are asked.

Those who have been confronted with this situation with respect to steam locomotive performances for many years may take some comfort in the fact that some of

the claims which are now being made for operating costs and performance of Diesel-electric locomotives appear to be just extravagant enough that there is skepticism on the part of many railroad men as to their actuality. Just take the matter of Diesel freight and passenger locomotive operating costs, for example. In a recent issue of this publication there appeared in an editorial discussing the matter of riders on Diesel power, some cost figures and labor and material relationships involved in Diesel repair work. It is but natural, in view of the variety of conditions under which Diesel-electric power operates on the railroads scattered . over this country, that conditions on one road can be so greatly different that it is perfectly obvious that the cost figures on one road should be and are considerably higher than on some other road.

The matter of total mileages made by Diesel-electric locomotives between shoppings for general repairs is another matter that is causing some concern among railroad mechanical and operating officers. There have been many performance records where 600,000 to a million miles have been run between shoppings, and it is but natural for those who are skeptical to point out the fact that in this term of service many of the units of Diesel-electric locomotives, such as trucks, power plants and individual engine and electrical parts, have been replaced—so much so that, as one mechanical man put it, "There is nothing left of the original locomotive at the end of the million miles but the underframe and the number."

There is, however, one thing to remember, and that is that a locomotive, whether it be Diesel-electric or modern steam power, is an operating too' that is of value to a railroad only when it is being or can be used. From a mechanical man's standpoint there may be some significance in the fact that a million-mile-locomotive has very few of its original parts left, but from the operating man's standpoint, the important thing is that the mere process of changing those parts gave that locomotive an availability of 90 or 95 per cent.

Getting Output From a New Machine Tool

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Among the wheel shops of the country in which many thousands of dollars have been invested in new machine tools and shop equipment in an effort to improve the accuracy of the finished product and the output of the shop is one on an eastern railroad where about \$100,000 was spent within the past year. Almost a fifth of this money went for a new hydraulic-control wheel borer with the full confidence that, because of the greater production capacity of the new machine, between \$3,500 and \$4,000 annual savings would result.

This shop has been operating for years with two wheel-boring mills, now over 35 years old, which have a combined productive capacity of 40 wheels in an eight-hour day, each machine requiring the services of

an operator. The new machine had an estimated output of 70 to 80 wheels a day and it was proposed to fill the wheel-boring requirements of the shop—which, incidentally, right now, is turning out from 1,500 to 2,000 mounted wheel sets a month—by the use of the new machine and the best of the two old machines—still two operators, but an expected 250 per cent increase in output.

The shop management, however, overlooked the attitude of the shop committee toward matters of this kind and, when all the argument was over, the new machine was found to have an output of 20 wheels a day—the same as the old ones—through various and devious caprices of human nature, by which the operator of the new machine, for example, developed illnesses that required such extended periods of rest that he could only work about one-third of the time.

This writer, being in a somewhat detached position with respect to matters of this kind, asked "What can you do about such conditions?" and the answer was "Not much just now." That, it seemed, was an unsatisfactory answer, so, a day or two later, in conversation with a shop man on a neighboring railroad we asked again, "What can be done about such conditions?" This time we got an answer, and were told that almost identical circumstances had prevailed in his shop a short time before in connection with the installation of an identical machine. The "slow-down" operator, in this case, along with his craft representative, was told that the railroad had invested \$20,000 in that machine and expected to get out of it what they paid for it.

Several maneuverings among members of the machinists group resulted in a succession of operators on the new machine whose terms of service were relatively short until, finally, a young machinist, not long out of his time, bid the job and got it, without opposition.

In the meantime, something happened to the two old boring mills that had been doing business for about 40 years and, "there being a war on and no repair parts," the company just had to scrap the old machines—really nothing else to do about it—so they were left with nothing but the new machine and a new operator who evidently hadn't been around long enough to learn how to make a good job last a long time.

Business being what it is and every rip track and shop on the railroad yelling loudly for wheels, and more wheels, the new operator stretched himself one day and turned out 102 wheels on the new machine.

There's a little arithmetic involved in this performance. In an eight-hour day there are 480 min. and at the 102-wheel output the average floor-to-floor time is about 4.8 min. The new machine is equipped with tools and handling equipment that makes the 102-wheel output an easier job than the 20- to 35-wheel output of the old machines.

If there are any better examples of the value of retiring obsolete machine tools and acquiring modern machines and tooling facilities, we'd like to know where they are.

ELECTRICAL SECTION

Rewinding Traction Armatures

Part I

WITH the increased number of electric and Dieselelectric locomotives in use, the longer hours of operation, and the heavier loads, old maintenance problems have been accentuated; new ones have arisen. Down the long list of these problems is one entitled "Armature Rewinding."

The object of this paper is to review for those experienced in the art of armature rewinding and to cite for the newcomer some of the important and frequently overlooked factors which must be considered to restore a damaged armature to its original condition and to modernize and improve, consistent with current practices.

Railway armatures present an interesting though difficult problem since they must withstand the severe strains imposed upon them by varying loads at varying speeds** plus the several combinations of vibrations and strains resulting from train motion and roadbed shock, and often with rapidly changing ambient temperatures.

Analysis of Failures

Traction motors are of necessity rugged in design because of inherently severe duty requirements. The kind of service is such that road failures must be kept at a minimum, not only because of the direct cost but because of the consequent expense incurred when traffic movement is obstructed. In most industrial plants a replacement motor or part can be installed in a comparatively short time. With motive power, however, the point of operation is not fixed and failures may occur many miles from the nearest repair or exchange facility.

* The authors are on the staff of the National Electric Coil Company, Columbus, Ohio.

** Abstract of a paper recommended for publication by the Committee on Land Transportation, American Institute of Electrical Engineers.

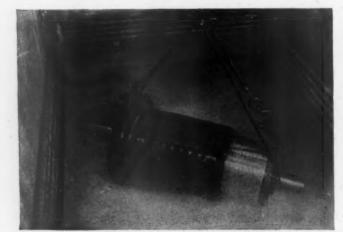


Fig. 1-Vapor cleaning tank

By N. J. Greene, D. E. Stafford and C. Gentilini* ing co ins mu

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A summary of the best practices for maintaining motors in firstclass operating condition

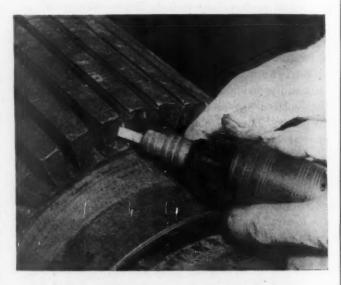


Fig. 2-Clearing surface-fused laminations

In spite of equipment design and operating precautions taken to prevent failures, they will happen. To minimize these failures, an analysis of the cause of each must be made and steps taken to lessen the possibility of a recurrence. Causes of armature failure can be divided into two classes: (1) those which can be attributed to faulty operating conditions, and (2) those originating within the motor due to mechanical or electrical defects.

Causes of armature failures may be numerous and varied; however, some of the major and frequently occuring troubles are discussed in the following paragraphs. The armature winding may be completely roasted because of a mechanical fault causing excessive overload; it may be roasted because of heat resulting from friction generated when worn-out bearings or journals allow the armature to rub the pole pieces. The armature winding or commutator may be grounded, short-circuited, or opencircuited; bands may fail due to overspeeding, but in all cases the cause can be assigned to either the category of faulty operation or to that of a defect in the motor proper.

Most failures traceable to a motor defect originate first as a mechanical failure. Improperly seasoned arma-

ture insulation caused by incorrect baking and hot banding procedure may permit relative movement of wires or coils which will cause actual mechanical destruction of the insulation and result in an electrical failure. Faulty commutator seasoning on high-speed traction motors, weak brush-holder spring tension, and short or binding brushes are only a few additional things to consider when analyzing armature failures. The advantage of a thorough investigation to determine the cause of each failure cannot be stressed too strongly.

Cleaning and Preparation of Core

The proper cleaning of cores to be rewound goes beyond removing the old coils and scraping out the slots. Grease must be removed, old paint must be stripped,

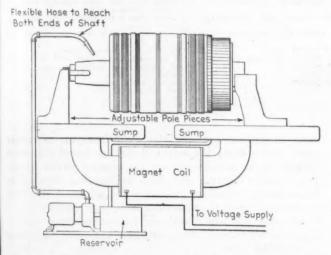


Fig. 3-Traction armature in position for magnetic inspection of shaft

vent ducts cleared, and the outer surfaces of laminations cleaned. One of the most effective methods of accomplishing these aims is by the use of hot vapor cleaning—a process termed by the sheet metal industry—"degreasing." The equipment consists of a heated tank with a few inches depth on the bottom of the liquid cleaning solution (normally trichlorethylene) and a water-cooled condensing coil around the tank about half way up the side wall.

In operation, an armature to be cleaned, with its old winding intact, is lowered into the gaseous medium existing between the boiling pan and the condensing coils. As the vaporized cleaning solution is kept at a temperature of 188 deg. much higher than the object being cleaned, the vapor condenses upon the object, attacking grease, dirt and varnish. Condensation is so rapid that the fluid flows from the work in a steady stream, carrying with it dissolved materials. Upon first seeing this

action, one would think that liquid was being fed onto the object from an invisible pipe line.

When the entire armature is placed in the tank, not only is the grease and dirt removed but the insulating and bonding varnishes are softened, facilitating the removal of the old winding. This procedure minimizes the hazard of lamination damage when extremely tight coils must be stripped from the slots.

After the temperature of the work has reached that of the vapor, condensation ceases and the cleaning process stops. The armature may be withdrawn from the cleaning tank, and a few strokes with a wire brush removes loose residue and flakes of varnish. If the slots have been dirty, it may be necessary, after removing the coils, to return the stripped core to the cleaning tank for another treatment; but a second cleaning is only occasion-

ally required.

The solvents normally used in this type of apparatus have little or no dissolving effect upon some types of coating materials such as shellac and certain synthetic enamels. The vapors have no effect on water glass (silicate of soda) or other standard lamination insulating varnishes. Tests reveal that, after these lamination insulating materials have been suspended in the degreasing vapors for ten minutes, neither their surface smoothness nor adherence to the metal has been affected. A mica commutator segment and cone ring given the same treatment were found to have a very small increase in weight, which was caused by the shellac softening under heat and allowing some vapor to collect. This increase in weight was lost after cooling took place, with no damage to the mica splittings or the shellac bond.

Over a period, repeated dips and bakes build multiple layers of baking varnish on the laminations, in the radial vents, and in the longitudinal core ducts. This insulating coating retards heat transfer and restricts air flow. The removal of this varnish in the "degreaser" will restore original ventilating efficiency to the armature. The elimination of grease from commutator, mica, and cone rings provides a clean surface to which insulating and pro-

tective coatings may be applied.

Core laminations of armatures which have failed are frequently found to have been damaged by arcing in slots between conductors and core. Also, the outer surface of core may have been defaced by pieces of conductors or bands being caught between armature and pole faces. Where any of the damage is severe, new core stacking may be necessary. However, after most armature failures, core-stacking will not be required.

A very effective method of removing the fused surfaces in the core slots is to grind them out with a high-speed, portable tool as shown in Fig. 2. Sufficient grinding should be done to clean up all short circuits between laminations. Otherwise, hotspots may be expected to

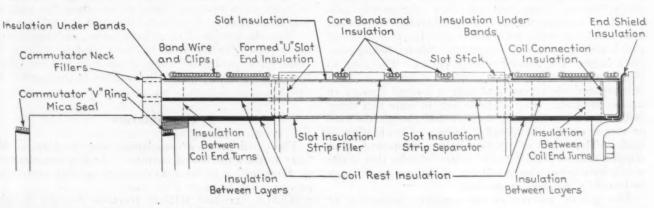


Fig. 4—Guide for armature rewinding materials

Guide for Armature Rewinding Materials

	Guide for Armature Rewinding Materials	8
Core type:	Coil rests	Use with AIEE Class B coils Flexible mica, oiled asbestos paper or .030. in varnished glass cloth, tapings of glass tape, moulded mica rings
0	Coil shield	Flexible mica and .030-in. varnished glass cloth, moulded mica rings
Slot type:	Troughs or cells Fish paper or high density rag paper	Preferably none—use uncut mica if filler is needed
	"U" end piece Rag pressboard Bottom fillers Pressboard, fish paper, or high density rag	Treated asbestos tape Sheet bakelite, oiled asbestos paper, or moulding mica
	Coil separators Pressboard, fish paper, or high density rag	Sheet bakelite, coil asbestos paper, or
End type:	Between layers	moulding mica Oiled asbestos paper Flexible mica or .030-in, varnished glass
	Between knuckles or rear coil connections. Treated duck or high density rag paper	cloth or Mica-Glas combination Flexible mica or .030-in, varnished glass
	Between coil end turns	cloth or Mica-Glas combination Glass, asbestos, or canvas-base bakelite,
Wedges or sticks:	Coil retainer or protective strip	moulding mica Asbestos-base bakelite, glass-base bakelite, or canvas-base bakelite
Band type:	On core Fish paper, rag paper, or rag pressboard On coils Treated duck, fish paper, or high density rag paper	Uncut mica or varnished asbestos paper Flexible mica and oiled asbestos paper or varnished asbestos cloth
Misc. types:	Commutator seal	1/16-in. glass braid painted with red com-
	Band wire	Tinned steel Grade C-1 or tinned 18-8 stainless steel
	Band clip	Tinned steel or tinned copper 100 per cent tin. 95 per cent tin—5 per cent antimony, or high-temperature alloy
	Flux Non-acid rosin flux Dipping varnish Synthetic black baking Spray varnish Black oilproof air-dry	Non-acid rosin flux Synthetic black baking Black oilproof air-dry

occur in operation, their severity depending principally upon the amount of fusion, the relative location, the magnitude of the armature current, and the frequency.

On older-type armatures having core bands, it is often desirable to true up the banding grooves before rewinding. They are often burred over by the tangled mass of banding wire and copper that sometimes gets between the armature surface and the pole piece. An often-used practice for accomplishing this is to drive a hard maple block into each slot, filling to the bottom of the band groove and then with the armature turning in a lathe, true up burred-over laminations at edges of band groove, taking light cuts with a high-speed, tool-post grinder.

Magnetic Inspection

Magnetic inspection is the term applied to the process of examining ferrous metal pieces for flaws by magnetizing the piece and dusting fine iron particles or flowing over the piece a solution with iron particles in suspension. Since different magnetic poles are formed at the cracks, a concentration of the magnetic particles will collect so that the defects can be found by visual inspection.***

Magnetic inspection, although not new, has come into common use only since the great forward developments of aircraft, which must, of necessity, use materials efficiently to achieve lightness and safety. Railway equipment, although not limited to the same extent as that of aircraft, is subjected to repeated stresses that may cause costly failures. Armature shafts are continuously subjected to twisting torques while rotating. alloy steels are used for these shafts; however, a metal that is fatigue-proof is not available. Shafts, before complete failure, will develop fatigue cracks. The application of magnetic inspection to traction armature shafts is comparatively recent, and only a limited amount of data is available. The available data indicate that many factors must be evaluated, such as shaft design, the load or torque on the shaft, and frequency of application of The users of traction motor equipment must compile data on the fatigue of shafts in order that shafts which have reasonable possibility of fatigue cracks may be tested by magnetic inspection.

The general practice in the magnetic inspection of traction armature shafts is to apply the test to exposed surfaces without pressing the shaft from the armature core. One Class I Western railroad has found that most fatigue cracks are detected on the tapered pinion fit adjacent to the bearing fit. This finding has resulted in the following handling procedure for all armatures that are removed from the motor frame for any reason:

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1-Remove the pinion and anti-friction bearings

2—Clean all exposed shaft surfaces, removing all grease and dirt

3—Magnetic test and inspect for fatigue cracks, fractures, and defects

4-Check for shaft trueness and alignment

5-Renew defective shafts

Fatigue cracks in armature shafts are not limited to the zone between the bearing and pinion fit. If a complete check is wanted, the shaft must be removed and tested over its full length.

Various types of equipment are available for performing magnetic inspection. Some use alternating current, some direct current from storage batteries, and others use rectified alternating current for excitation of the magnetic structure. Any type excitation is generally suitable for inspecting traction motor armature shafts for fatigue cracks. The equipment for checking consists essentially of a magnetic yoke assembly with adjustable pole pieces for contacting the ends of the shaft and an excitation coil with control for allowing current to flow in the coil for comparatively short intervals (.00001 to 3 sec.), similar to that shown in Fig. 3. Magnetic particles in liquid suspension are easier to use, since the solution may be pumped or flowed over the shaft.

Magnetic testing of the wheels, axles, and locomotive crank pins of rolling stock has been used by many railroads for a number of years. Some railroads are effectively using the same equipment for testing armature chafts

Commutators

The condition of a commutator may indicate a real story to the experienced operator. A close examination is, therefore, a prime consideration so that corrective measures can be taken if necessary.

NEMA Standard RP4-20 specifies that the Brinell hardness shall be 75 for bars of .125 inches and less at

the thick edge, 70 for thickness of .125 inches to .250 inches, and 65 for bars over .250 inches. When a commutator shows evidence of having been very hot, it is good practice to test the hardness of the bars and to replace those which are too soft. It is also important on commutators of high peripheral speed that the amount of bar stock depthwise be checked so that there will be no danger of the bar bowing outward because of centrifugal forces. When in doubt as to the depth of the bar remaining, a check with the commutator manufacturer is warranted. If the depth is less than a safe value, the commutator must be renewed.

After the winding is removed from the armature, the commutator slots are cleaned for the new coil leads, all burrs and fins are removed, and the commutator is given. a ground test with the proper test voltage as specified by AIEE Standards. The authors have been unable to find a published Standard for a bar-to-bar test but have very successfully used a value of 220 volts alternating current,

60 cycles.

If the V-rings are loose or have been disturbed, the commutator should be seasoned before again placing the armature in service. Many different practices are followed in the seasoning of commutators, and most of them have good points. The object of seasoning is to obtain a tight commutator that will not develop high and low bars after being placed in service. To accomplish this objective we must apply the same elements that produce distortion in service, namely, heat and centrifugal force. The commutator assembly may be rotated in a heating rig and the bolts uniformly tightened at intervals. For the required uniformity in tightening the clamping bolts, it is recommended that a torque wrench be used.

As little copper as possible is removed from the commutator in turning and truing. The point of the tool should be rounded so that a smooth surface results. Final surfacing can be done with a stationary stone mounted in the tool post with the armature running at a high speed. A final polish may be given with a hand stone or very fine sand paper. The commutator should be true within .001 inches for any high-speed motor. Where greater precision is wanted, the commutator may be ground with a carborundum wheel while the armature is rotated at full speed in its own bearings in a special grinding rig.

Undercutting of commutator mica segments first came into use over 35 years ago, and though at first it was not accepted, there is today little occasion to doubt its merits. However, expert care must be exercised in the operation, or the merits of undercutting are lost. It is very important that all mica fins be removed as they are frequently the source of unsatisfactory operation. After undercutting, the rough corners of the copper bars must

be removed.

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After the commutator has been finished, it should be thoroughly cleaned and the armature blown out to remove all the copper chips and dust. It should be carefully inspected and then given a ground test according to AIEE Standards.

The protection of the outside surface of the V-ring mica that projects beyond the commutator can readily be accomplished by applying a coat of shellac, running over this a single layer of Fiberglas braid, and coating repeatedly with red enamel, sandpapering between coats. This will result in a very smooth surface which will minimize the collection of dust and oil.

Rewinding Materials

An often overlooked important element of armature rewinding is engineering planning of the rewinding materials. Rewinding materials include all insulation, solder, band wire and the like material, exclusive of the coils. Fig. 4 gives the location of various items of rewinding material, and the table therewith will serve as a general guide as to good practice in the use of material with A. I. E. E. Class A and Class B windings. Precision armature rewinding necessitates complete drawings of the armature assembly and they should be accompanied with detailed instructions on the method of application of each of the items of rewinding material. Information gathered from the analysis of failures is a part of the engineering data which is required for preparation of these rewinding specifications. Each item of rewinding material must be engineered for its job.

Too often certain items of insulation are applied to an armature because it has been customary to use insulation in that particular spot on similar equipment. Frequently overlooked in applying rewinding insulation are the formation of pockets for trapping carbon dust and other foreign material; obstruction of ventilation; formation of dead air pockets; and the use of materials that are heat insulators. These factors weigh heavily in the selection of proper rewinding materials. The material under the bands may be taken as an example. This material should preferably be of a cushioning nature such as varnished asbestos cloth or paper, in order that the material will not chafe and disintegrate when affected by winding movements resulting from expansion, contraction, acceleration, and deceleration.

Economical rewinding requires that many items of the insulation be precut and fabricated. Volume production permits the use of tools and dies for shaping the rewinding material to greater accuracy than is possible by hand cutting and shaping. Better quality workmanship may be expected by the use of packaged, pre-cut rewinding material along with complete instructions for

its use.

(To be continued in the September issue)

Train Communication In Electrified Tunnels

The Chicago, Milwaukee, St. Paul & Pacific has conducted tests of the Union Switch & Signal Company's system of inductive train communication of the electrified territory, 440 miles between Harlowton, Mont., and Avery, Idaho, and 216 miles between Othello, Wash., and Seattle-Tacoma. The first item was to determine whether the train communication would operate satisfactorily under the overhead catenary energized at 3,000 volts d-c. and with a wayside power circuit at 100,000 volts a-c. Also it was quite possible that the traction motors on the locomotive, when pulling or when being used in regenerative braking, might cause interference with the train communication. In brief, no such interference was encountered at any time during any of the tests.

A second purpose of the test was to learn if the train communication would operate properly when the locomotive and/or the caboose were running through the numerous tunnels including the Snoqualmie tunnel through the Cascade mountains which is 11,890 ft. long and 1,500 ft. below the surface of the ground at the deepest point. Numerous tests proved that the inductive communication system operated satisfactorily not only when the train was in tunnels, but also when in deep

gorges or alongside rivers.

Head-End Train Lighting

The Central Railroad of New Jersey is now in the process of equipping suburban trains operating out of Jersey City, N. J., with head-end lighting, power being supplied by a steam-turbine-driven generator mounted on the locomotive tender. The trains serve commuter traffic in and out of New York City, connection being made by ferry between Jersey City and New York. Nine trains are now equipped, one making a daily round trip between Jersey City and Barnegat, N. J., another running daily between Jersey City and Freehold, N. J., and seven main line trains operating between Jersey City and Dunellen, N. J. A total of 17 locomotives and 60 cars are now equipped. The ultimate program will include 60 loco-

Weather-proof enclosure for fuses mounted on one side of the tank sill-Note wooden block fastened inside cover to prevent fuses working out of clips

motives and 300 cars of which 40 locomotives and 200 cars have been authorized.

The installation is being made to provide the best lighting for this type of service which involves short runs and frequent stops, and to do it at a minimum cost. The system is limited in that it must be used with locomotives and coaches equipped for this type of lighting but it represents the ultimate in simplicity and ease of maintenance and will be standard on all Jersey Central suburban runs. It assures constant voltage on the lights, disposes of battery charging and many maintenance problems and removes about 4,000 lb. of equipment from each car.

Train Equipment

The lighting load on each car is 950 watts and consists of eight 100-watt lamps in dome fixtures arranged along the ceiling of the car, four 25-watt vestibule lights and one 25-watt light in each of the two toilets. The circuitswitch panel is located in the men's toilet and the circuit switch for the toilet light is held in the closed position with a cotter pin. A toggle switch on the wall outside the door is wired in series with the switch on the panel. This arrangement allows the trainmen to turn on the toilet light from the outside and avoids the need of groping in the dark for the switches on the panel.

The turbo-generator sets which supply power for the trains are 125-volt Pyle-National machines and are

Jersey Central to equip 60 locomotives and 300 cars—Battery charging lines are used for a. c. standby terminal service

mounted on the rear of the tender immediately behind the water hole. All but ten will be 12-kw. sets, $7\frac{1}{2}$ -kw. machines being used on smaller locomotives which are used for shorter trains. The 12-kw. sets will be used on trains up to thirteen cars and on test showed a capacity sufficient for fifteen. Barco flexible couplings are used between the locomotive and the tender in the steam line to the turbine. There is a steam valve in the locomotive cab for controlling the steam to the turbine but there is no switch in the generator circuit.

Leads from the generator are carried down through the tank in a pipe, welded top and bottom, to a Colt no-arc weather-proof enclosure, containing two 200-amp. cartridge fuses mounted on the side of the tank sill at a location convenient for inspection and replacement of fuses. A wooden block on the inside of the box cover prevents vibration from working the fuses out of the clips. From the enclosure, the leads are carried in conduit to a two-wire receptacle at the rear of the tank and another at the front of the locomotive, since the locomotives are required to run in both directions.

Three-wire train lines are used which consist of 2/0 flexible rubber-covered wire in 2-in. conduit run under the bodies of the cars on the side opposite the steam pipes.



A two-wire train line receptacle as mounted on the back of a tender— Similar three-wire receptacles are mounted under the end sills of each passenger car

Three-wire, Pyle-National receptacles are mounted on the left side of each car and connectors between cars are supported at their midpoint on hooks made of twisted flat iron which make a quarter turn of the hanger necessary for application and makes its bouncing off impossible.

Lamp circuits in the cars are connected to train line

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One of the one-to-one transformers, double-throw switch, pilot lights, and at the bottom, an enclosure for fuses protecting the a.c. circuit

No. 1 and No. 2 while the generator is connected to the No. 1 and the No. 3 or loop wire. The loop wire is connected to train line No. 2 at the rear of the train, this connection being made automatically in the last receptacle. When there is a train-connector plug in a receptacle, the connections are carried straight through, but when there is no plug, contacts No. 2 and No. 3 are connected together. Thus the current from the generator flows through train line No. 1 to the lamps and then through train line No. 2 to the rear of the train returning to the generator through the loop or No. 3 line. This arrangement makes the line resistance drop to each lamp the same and equalizes the socket voltages throughout the

train. Lamp-socket voltage is maintained at 120 and voltage at the generator is 126 on a ten-car train, compounding of the generator compensating for changes in load caused by changes in the number of cars in the train.

Terminal Power Supply

When a train is standing in the Jersey City terminal it is often necessary to have lights in the cars before a locomotive is attached to the train. By means of a simple and ingenious arrangement of connections, the necessary power is supplied to the train from the a. c. power circuits in the terminal. The battery charging lines in the terminal are made to serve as a. c. lines for lighting as well as for battery charging of through line cars which leave the same terminal.



One of the a.c. service jumpers as connected between a charging lead terminal and a three-wire receptacle on a car

One of the 12-kw. turbine generators mounted on the back of the tender—The conduit fitting at the upper end of the conduit which runs down through the tank may be seen at the left—The conduit runs through a thimble installed in the tank proper



A double-throw switch is mounted in a cabinet at the bumper block on each track with its center poles connected to the charging line. When the switch is thrown down, d. c. charging current is connected to the lines. When it is thrown up, 120-volt a. c. power is fed to the lines through a one-to-one isolating transformer which keeps grounds on the charging lines off the a. c. supply lines and avoids a. c. voltage to ground in the cars. When the switch is in the "up" position, a third contact closes a circuit to two pilot lamps mounted outside the cabinet. These lamps can be seen from any one of the charging outlets served from the switch cabinet. Two lamps are used to protect against loss of signal by a lamp failure. Overload protection of the transformer is provided by fuses in the a. c. circuit between the transformer and the double-throw switch.

Switching from A. C. to D. C. Power

When a train is to be supplied with a. c. power, the double-throw switch is thrown up, putting a. c. power on the charging line. One of the regular charging leads is used to run from a charging receptacle to the rear of the train where a special jumper is used to make connection with the three-wire train line receptacle. The jumper is so connected that a. c. is applied to train lines No. 1 and No. 2. The third plug contact serves only to hold the loop circuit open.

With the lights in the train burning on a. c., a locomotive may be coupled to the front of the train, connections to the turbine generator made and the generator put in operation. This puts d. c. voltage between train lines No. 1 and No. 3 but there is no confusion of circuits because the loop is open at the back of the train. Before the train is ready to leave, a station electrician disconnects the jumper from the charging cable and then pulls the other end of the jumper out of the train line receptacle. The lights go out for a brief moment as the a. c. circuit is disconnected and relight immediately on direct current since pulling the plug from the train line receptacle closes the loop.

Electrified Swedish Lines Carry 86 Per Cent of Traffic

This year marks the thirtieth anniversary of the completion of the first electrified steam railway in Sweden. Coal has been a vital factor in promoting the use of hydroelectric power and it has been estimated that the electrification of the Swedish State Railways has saved 7,000,000 metric tons of coal during the war. The anniversary coincides with the inauguration of the newly electrified section between Ostersund and Jerpen in the northern province of Jemtland, which later this year will be extended up to the Norwegian border.

The Swedish State Railways, at present, operate about 6,990 miles of the country's total 10,200 miles of railway systems. Over 2,760 miles of the State lines have already been electrified and further sections are under consideration, although the shortage of materials, especially copper, has hampered activities. The rate of growth of the electrification is indicated by power consumption figures. Total power consumption in 1915 was 8,000,000 kwh., in 1925 it was 75,000,000, in 1940 it had risen to 667,000,000 and for 1945 the estimated consumption is 915,000,000.



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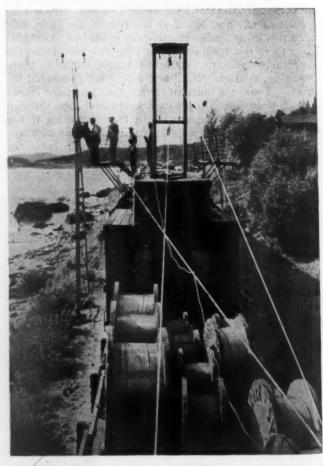
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One of the Swedish State Railway's new type M locomotives, rated 3,600 hp.

Economically the electrification has been a good investment. Compared with a cost of about \$137,500,000 for the above mentioned 7,000,000 tons of coal, the cost of hydro-electrical energy has been about \$22,500,000 and, deducting interest, etc., on installations amounting in all to \$25,000,000, the estimated saving is about \$90,000,000.



A wire train in service stringing overhead wires on Sweden's most recently electrified line

Added advantages have been derived from the fact that the electrification permits of faster and heavier trains. Scheduled operating time on the 1,213 mile run from Trelleborg in the extreme south of Sweden to Riksgransen in northernmost Lapland, has been reduced by one-third. This line was completed in 1942.

Railroad Radio Laboratory Car

The Aireon Manufacturing Corporation has purchased and equipped a special railroad car to be used in the demonstration, test and installation of its railroad radio

Originally built for dynamometer and track inspection service, the all-steel car has been completely remodeled and equipped with ultra-high frequency "space" radio telephone units, and inductive, or "carrier" type equipment, both of which systems are manufactured by Aireon. A carpeted lounge occupies half of the car, and a galley and eight standard Pullman berths are provided so that



The car is fitted for making tests of both space radio and carrier type train communication systems

Aireon engineers and railroad officials may travel in the car on demonstration, test and installation trips.

The car is now on its first assignment; a test installation for the Denver and Rio Grande Railroad between Grand Junction, Colorado, and Salt Lake City, Utah.

Under the supervision of Samuel W. Fordyce, general manager, railway equipment division, Aireon Mfg. Corp., the car will be made available to railroads throughout the country in connection with the demonstration, test and installation of Aireon's railroad radio telephone equipment.

CONSULTING DEPARTMENT

Cross-Arms or Secondary Racks

We are planning to rebuild our secondary distribution lines consisting of three-phase 440-volts for power and 110/220 volt three-wire, single-phase for lighting. Which would be most economical and efficient over a period of years, secondary racks or cross-arms and pins?

Racks Cheaper. But Not Always Best

If the operating conditions for the three-phase 440-volt power and the 110/220-volt three-wire lighting lines were known, it might be possible to give a definite recommendation as to the most economical type of construction to use. However, without having all of the facts as, for example, the length of the spans, the size of the wires, location with respect to smoke areas, etc., it will be necessary to answer the questions by setting forth the various factors involved, and then leave it to the person who asked the question to work out his own answer for his particular case.

The largest users of secondary lines are the power and light companies that supply electrical service to industrial and residential loads. From general observation, it would seem that at least 95 per cent of all of their secondary lines are supported on racks. This would indicate that secondary racks are the most economical type of construction for them to use. Nevertheless, secondary racks installed on a railroad right-of-way have to meet differ-

ent operating conditions than do secondary racks installed along a city street or a country road.

In the first place, coal smoke not only covers the small insulators used with racks but it also combines with moisture to produce sulphurous acid. Generally speaking, the operation of low voltage lines are not seriously affected by dirty insulators, but secondary racks, even though they are heavily galvanized, can not stand the corrosive action of smoke. In fact, one metallurgist went so far as to state that smoke will corrode galvanized iron faster than ungalvanized iron. This is especially true if the ungalvanized iron has been painted or protected with one of the rust-preventing compounds.

In the second place, wires that are installed across railroad tracks must have proper clearance above the top of the rails, and it is evident that wires positioned in vertical alignment will cut down the clearance as compared to wires installed on cross-arms or on the same poles. Also wires installed across tracks, even though they are owned by the railroad company, should comply with all of the rules and regulations governing such construction. It is inconsistent for a railroad company to compel power companies to follow all of the state and railroad specifications, while at the same time allowing their own electricians to install wires that do not comply with these same specifications. It is the writer's opinion that secondary rack construction can not be installed in accordance with the railroad specification requiring double cross-arms for supporting wires at the crossing span.

In the third place, it is never advisable to support bare conductors from secondary racks, but this is frequently done when cross-arms and pins are used, because there is less likelihood of horizontally positioned wires swinging together than there is of vertically spaced ones. This is an important factor when stringing wires across railroad tracks where steam equipment is operated. The hot gases from a locomotive can ruin the weather-proofing on wires, and if a locomotive stops with the smoke stack directly under the wires it is possible for the exhaust from the engine to lift the wires. If this should happen to wires supported vertically from secondary racks, a short circuit is likely to accur.

From the foregoing it would appear that the somewhat old fashioned cross-arms and pins have a place in the construction of secondary power and light lines used for rail-

road service.

P. C. FREDKY

Selection Governed by Conditions

Various conditions must be considered to determine which type of installation is more suitable for a given job. Some of these conditions are: length of line to be built, number and location of services to be taken off, number of corners in the line, and clearance over buildings or tracks. It is usually best when a line is to be built or rebuilt to figure out where each pole will be set, then make a sketch approximately to scale, marking services, guys, pole heights, etc., on the sketch. This would of course not be necessary for a short straight line with few services.

The initial cost of building a line is usually less using cross-arms and pins if the line is straight. Cross-arms provide more ground clearance for a given pole height and in some instances would allow using shorter poles than would secondary racks. However, taking off serv-

ices, particularly where several services come off one pole, is facilitated by using secondary racks, and corners in a line necessitate buck arms, which increases both material and labor cost.

Conditions existing around railroad shops and shop yards are ordinarily such that secondary racks are most suitable. There are usually numerous services for both lights and power sometimes coming off corner poles, in which case secondary racks are more economical and make a better looking job than cross-arms. Buildings, tracks and other shop facilities quite often make it necessary to zig-zag lines, in which case secondary racks are usually preferred.

Each type of installation has certain advantages over the other, usually, as before-mentioned, governed by conditions. Careful analysis of these conditions will usually provide the answer as to which to use.

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Good Fir Is Scarce

The question of whether to use cross-arms or secondary racks is frequently governed by the difficulty of securing a good grade of fir cross-arms. The use of fir is controlled by numerous WPB restrictions, and with the limited supply coming out of the woods the quality at present is none too good. For anything except special conditions necessitating the use of cross-arms, I would suggest secondary racks for distribution of the three-phase 440-volt and the three-wire 110/220-volt single-phase circuits.

JOHN M. DRABELLE



This group picture at the change of shift, includes the first- and second-trick shop men at the new Diesel shop of the Delaware, Lackawanna & Western at Scranton, Pa.—Also included are the supervisors and several service representatives.—The mascot, in the foreground, bears the name "Diesel"

NEWS

First Rail Apprenticeship Agreements Signed

THE first two agreements between railroad management and labor under the National Apprenticeship Program designed for the training of skilled employees in the shop crafts have been signed, Paul V. McNutt, chairman of the War Manpower Commission, announced recently. Parties to the agreements are the New York Central and the Union Pacific, and the System Federations of the Railway Employees Department, American Federation of Labor.

Crafts in which apprentices will be trained include machinist, sheetmetal worker, carman, boilermaker, blacksmith, and electrical worker. The agreements provide for joint apprenticeship committees representing management and the unions to be organized for all points where sufficient apprentices are employed to warrant them. These groups will administer local training programs. Also, a general apprenticeship committee is to be set up for each railroad system. It will recommend rules for selecting apprentices and for governing apprentices on the job and in classrooms.

Commenting on the signing of the agreements, W. M. C. Chairman McNutt said: "It is necessary that an adequate supply of competent journeymen mechanics, who are skilled in all branches of their respective trades, shall be available at all times for an industry as essential to our national economy as the railroad industry. Management and labor are to be commended for their foresight and joint action to meet this problem. These agreements, coinciding with the imminent discharge of a large number of military personnel, will be mutually advantageous to the railroads and the former service men. The railroads are in need of manpower and many service men will want to learn a trade. I am confident these agreements will do a great deal to supply the needs of both groups."

The W. M. C. announcement went on to say that the participating railroad unions have working agreements with most of the railroads, adding that the N. Y. C. and U. P. apprenticeship agreements "are expected to be patterns for similar programs for the training of craftsmen in the trades mentioned for other roads where such working agreements exist."

Canadian Roads to Explore Possibilities of Radio

THE Canadian National and Canadian Pacific have announced jointly that recent development of point-to-point land-lines, radio automatic relay systems, by the two major communications systems in the United States justifies continued research to give the Canadian public this new medium of transmission. To minimize expense and avoid duplication of frequency allocations, the two systems have agreed to act jointly in the public interest. In addition

to using radio for inter-city relay links, the railways are considering its use in traindispatching.

Should the experiments be sufficiently encouraging to warrant permanent installations, the question naturally arises as to the extent to which radio relay systems will replace the present wire lines. The railways expect that wire lines will be retained for certain classes of service, using radio where

Orders and Inquiries for Equipment Placed Since the Closing of the July Issue LOCOMOTIVE ORDERS

	LC	COMOTIVE URDERS	
Road ·	lo. of locos.	Type of loco.	Builder
Chicago, Milwaukee, St. Paul & Pacific ¹	5 5 20	Diesel-elec. frt. Diesel-elec. pass. Diesel switchers	Electro Motive Fairbanks, Morse Baldwin Loco. Wks.
Chicago, Rock Island & Pacific ² Delaware & Hudson Minneapolis & St. Louis	4 5 4 ³ 1 ³ 3 ⁶	4,050-hp. Diesel-elec. frt. 4-6-6-4 1,000-hp. Diesel-elec. switch. 1,350-hp. Diesel engine. 4,000-hp. Diesel-elec. pass.	American Loco, Co.
Missouri Pacific	3° 8	2,000-hp. Diesel-elec. pass Diesel-elec. Diesel-elec.	Electro-Motive Baldwin Loco, Wks.
Texas & Pacific	10 54	4,000-hp. Diesel-elec. pass 1,000-hp. Diesel-elec. switch	Electro-Motive
	Loc	COMOTIVE INQUIRIES	
Rapid City, Black Hills & Western	18	800-hp. Diesel-elec. frt 1,000-hp. Diesel-elec. frt 2-8-4 frt	
virginian			
	F	REIGHT-CAR ORDERS	
Road	No. of cars	Type of car	Builder
Chicago, Milwaukee, St. Paul & Pacific	5001 251	Flat	
Erie	700	50-ton box	American Car & Fdry. Co.
	FRE	GHT-CAR INQUIRIES	
Chicago, Rock Island & Pacific Western Maryland	1,000	50-ton auto box	
	Pas	SSENGER-CAR ORDERS	
Central of Georgia	-286	Streamline pass	Pullman-Std.
Texas & Pacific	28 ⁶ 19 ⁶ 25 ⁶	Sleepers	Pullman-Std.

¹Road authorized by United States States District Court at Chicago to enter into conditional sales agreements amounting to \$5,908,535 for the purchase of locomotives and freight cars costing approximately \$7,108,535.
²Road granted permission by Federal Judge William J. Campbell to purchase four Diesel-electric freight locomotives, the total cost of which will be approximately \$1,344,000.
²Purchase authorized.
⁴Approximate cost \$400,000.
⁵For use on 1- to 4½-per cent grades. Equipped with pilots at both ends.
⁶Equipment ordered jointly by the Missouri Pacific and the Texas & Pacific for overnight service between St. Louis, Mo., and Dallas, Tex., Fort Worth, and Houston. Delivery of cars expected late in 1946. All passenger-carrying cars will have low-alloy, high-tensile and steel underframes with superstructures of aluminum alloy. Mail, baggage and express cars to be of low-alloy high-tensile steel throughout. steel throughout.

Miscellaneous Publications

"YESTERDAY'S IRON HORSES."-Union Steel Castings, Division of Blaw-Knox Co., Pittsburgh, Pa. "Yesterday's Iron Horses-1829-1900" presents in a book, plastic bound for easy removal for framing, illustrations of several representathe locomotives from a collection of "old timers" by Ed. Alexander.

STEELWAYS .- The American Iron & Steel Institute, 350 Fifth Avenue, New York 1. "Steelways," a 9-in. by 12-in. publication to be issued quarterly for the purpose of telling in picture and print some of the many ways in which steel serves to better the lives of people at home and in industry. Vol. 1, No. 1, issued in May, 1945.

it proves better or cheaper. The first step in the plan will be experimental installations between Montreal, Que., and Ottawa, Ont., and between Ottawa and Toronto, Ont. Progress will be limited only by restrictions on the wartime use of radio and the availability of equipment.

Clyde Williams Honored at Case School

In tribute to his leadership in advancing industrial science, Clyde Williams, director of Battelle Memorial Institute, Columbus, Ohio, was presented the degree of Doctor of Science at recent convocation ceremonies of the Case School of Applied Science, Cleveland, Ohio.

The degree was presented by Dr. William E. Wickenden, president of Case, who cited Mr. Williams' accomplishments in research administration and in directing the activities of the War Metallurgy Committee of the National Academy of Sciences and the National Research Council.

English Engineers Honor Two More Americans

E. G. Bailey, a vice-president of the Babcock & Wilcox Company, New York, and Jerome C. Hunsaker, head of the department of Mechanical Engineering, Massachusetts Institute of Technology, have been elected honorary members of The Institution of Mechanical Engineers in England, The total honorary membership of the Institution is now 29, six of whom are Americans. The four other Americans are Henry Ford (1939), Prof. A. G. Christie of Johns Hopkins University (1939), Orville Wright (1942), and Dr. Harvey N. Davis, president, Stevens Institute of Technology (1944).

J. D. Ritchie Research Chief of Plywood Association

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JOHN D. RITCHIE, chief inspector of the Douglas Fir Plywood Association, has been promoted to chief of the research department, with headquarters as before at Tacoma, Wash., succeeding J. D. Long, who is resuming his previous agricultural and educational work. George M. Williams has been appointed chief inspector, replacing Mr. Ritchie.

Supply Trade Notes

GENERAL STEEL CASTINGS CORPORATION.—Charles P. Whitehead, vice-president, has been elected president of the General Steel Castings Corporation to succeed Harrison Hoblitzelle, who has resigned because of ill health and who has been elected chairman of the board. G. Fred Driemeyer, manager of sales, has been elected vice-president in charge of sales; George L. Alston secretary and treasurer, has been elected vice-president and will continue as secretary and treasurer and William M. Sheehan, assistant vice-president, has been elected vice-president.

James MacDonald, since 1939 assistant to the vice-president—sales, of the General Steel Castings Corporation, has been appointed assistant vice-president. Before



H. Hoblitzelle

joining General Steel Castings, Mr. Mac-Donald was in the employ of the Baldwin Locomotive Works between 1931 and 1939 as assistant secretary, purchasing agent and assistant director of sales. Howard F. Park, Jr., general purchasing agent since 1942, succeeds Mr. MacDonald as assistant to the vice-president-sales. Mr. Park formerly was associated with the Edward G. Budd Manufacturing Company. Earl S. Howard will assume the duties of general purchasing agent in addition to his present position as general mechanical superintendent. Mr. Howard previously was works manager of the Eddystone, Pa., plant and of the Madison, Ill., armor plant.

Charles P. Whitehead was born in Bastrop, Tex., the son of C. N. Whitehead who was president of the Missouri-Kansas-



C. P. Whitehead

Texas at the time of his death in 1926. He is a graduate of Culver Military Academy (1917) and served in the United States Navy during the last world war. He joined the Commonwealth Steel Company in 1919 and was employed in the engineering and manufacturing departments. He was transferred to the sales department in 1922, handling the western railroads. He was appointed sales assistant to the vice-president and general manager of the General Steel Castings Corporation in 1929 with headquarters at Granite City, Ill. He was moved to Eddystone, Pa., as manager of sales of the company in 1931 and promoted to vice-president in charge of sales in 1938. He served as consultant to the chief of the

transportation equipment branch of the War Production Board during 1942. He was appointed vice-president in charge of manufacture, engineering and sales in 1943 and elected a director of the company in 1944. Mr. Whitehead is a member of the railroad industry, railroad locomotive specialty industry and steel castings industry advisory committees of the War Production Board.

Harrison Hoblitzelle is a graduate of Cornell University (1917). After occupy-



G. F. Driemeyer

Army-Navy "E" Awards

American Car & Foundry Co., Wilmington, Del., shipyard. Fifth re-

newal.

Babcock & Wilcox Co., Bayonne, N. J.

Renewal.

Bendix Aviation Corporation, Bendix Radio division. Fourth award.

Davenport-Besler Corporation, Davenport, Iowa. Third renewal. Independent Pneumatic Tool Company,

Aurora, Ill. Fifth award.

McKay Company, McKees Rocks, Pa.

Fifth renewal.

Pullman-Standard Car Manufacturing Company, Hammond, Inc. Fourth award. ing a number of positions with the Commonwealth Steel Company, he was appointed vice-president and general manager of the Commonwealth division of the General Steel Castings Corporation in August, 1929. He was appointed executive vice-president with headquarters at Eddystone, Pa., in June, 1931, and elected president in September, 1931. Mr. Hoblitzelle is a member of the board of governors of the Railway Business Association.

G. Fred Driemeyer is a graduate of the Washington University Engineering School. He joined the Commonwealth Steel Company's engineering department in 1919. After serving in various capacities, he was sent to Australia in 1927 and 1929 and to Paris in 1930 as European manager for the company. He represented General Steel Castings in the Chicago district from 1931 to 1939. He was appointed assistant works manager of the Commonwealth plant in 1939 and promoted to works manager in July, 1941. He was appointed manager of

sales with headquarters at Eddystone, Pa., in September, 1941.

George L. Alston joined the American Steel Foundries, Chicago, in 1906, and continued with that company until 1925. From then until the formation of the General Steel Castings Corporation he was associated with the Birdsboro Steel Foundry &



G. L. Alston

Machine Co., Birdsboro, Pa. He has been secretary and treasurer of General Steel Castings Corporation since its organization. He is a member of the advisory committee for the steel castings industry to the Office of Price Administration.

William M. Sheehan was educated in St. Andrew School, Roanoke, Va., and at St. Louis University. He completed an apprenticeship as a machinist on the Norfolk & Western and later served in the engineering



W. M. Sheehan

departments of that road, the Erie and the American Locomotive Company. He joined the Commonwealth Steel Company in 1913 and has served continuously since that time in the engineering and sales departments of Commonwealth Steel and its successor, General Steel Castings. He was appointed assistant vice-president, sales in 1939 and assistant vice-president in 1944. He is active in the American Society of Mechanical Engineers, and is chairman of the Executive Committee of the Railroad Division.

H. K. PORTER COMPANY, INC.—The offices of the Porter Company in Rochester, N. Y. have been removed to headquarters

in the Walbridge Building, Buffaio, N. Y. W. A. Coyle has been appointed district manager in charge of sales for Porter and Devine process equipment. He will also handle sales for Quimby Pumps and Fort Pitt Steel Castings in the territory. Mr. Coyle, who for the past ten years had been assistant combustion engineer of the Republic Steel Corporation in Buffalo, received his B. S. E. E. degree at Clarkson University of Technology and his master's degree at Lehigh University. He is a member of the Engineering Society of Buffalo, and of the Iron and Steel Engineers Society.

United States Plywood Corporation.

The United States Plywood Corporation has moved its executive offices in New York to 55 West Forty-fourth street.

NATIONAL MALLEABLE & STEEL CASTINGS COMPANY.—John F. Hutson has been appointed district sales manager, Chicago territory, including Omaha, Neb., St. Paul, Minneapolis, and Duluth, Minn., for the National Malleable & Steel Castings Company, to succeed Tom W. Aishton, who has retired because of ill health. Mr. Hutson has been with National Malleable since 1919, serving in Cleveland, Ohio, Washington, D. C., and Chicago. Since 1936 he has been sales agent at the Chicago railway



John F. Hutson

sales office. Frank E. Moffett has been appointed to the newly created position of assistant district sales manager for the Chicago territory. Mr. Moffett joined National Malleable in 1908 as a draftsman at the Chicago Melrose Park works. In 1919 he was appointed plant and safety engineer at the Cleveland works. He returned to Chicago in 1924 as service engineer in railway sales and in 1930 became sales agent. Edward O. Warner, for many years Philadelphia, Pa., district sales manager for the National Malleable & Steel Castings Co., has retired from active duty. Russell J. Wittmer succeeds Mr. Warner as Philadelphia district sales manager, William M. Blackmore has been appointed southeastern district sales manager.

Edward O. Warner is a graduate of Lehigh University (1894) with a degree in electrical engineering. He was employed by the Hartford, Conn., Street Railway Company and from 1896 to 1898 by the Pennsylvania. He joined the Latrobe Steel & Coupler Co. in 1898 and was placed in

charge of the Philadelphia office in 1902. When Latrobe was acquired by National Malleable in 1909, he was appointed Philadelphia sales agent and district sales manager.

Russell J. Wittmer was born in Waterloo, Ind., in 1895. He served in World War I and is a graduate of the Case School of Applied Science, Cleveland (1920). He



Frank E. Moffett

has been associated with the National Malleable and Steel Castings Company since his graduation. In 1923 he was sent to Europe on an engineering assignment, and since 1941 has been in the railway sales division. Prior to his assignment to the Philadelphia district he was sales agent in the southeastern territory, with headquarters in Washington, D. C.

William M. Blackmore was born in Cleveland. He entered the engineering department of the company in 1906 and was later assigned to the inspection and test



Edward O. Warner

department. In 1913 he became chief engineer and in 1919 was appointed assistant superintendent of the steel-castings plant at Sharon, Pa. He returned to the engineering department in 1931 and, prior to his appointment as southeastern district sales manager, was in the general office, engineering department, at Cleveland, where he worked on the development of railroad specialties.

MOUNT VERNON CAR MANUFACTURING COMPANY.—William J. Roehl, Inc., St. Louis, Mo., have been appointed freight-car-sales agents in the St. Louis district for the Mount Vernon Car Manufacturing Company, a division of the H. K. Porter Company of Pittsburgh, Pa.

DAVIS BRAKE BEAM COMPANY.—Roy H. Weber, San Francisco, Calif., has been appointed west coast representative of the Davis Brake Beam Company.

AMERICAN LOCOMOTIVE COMPANY.—Gus H. Sample has been appointed technical assistant to the director of engineering, Diesel division of the American Locomotive Company with headquarters at Schenectady, N. Y. Mr. Sample is a graduate of Washington University, with a degree in mechanical engineering, and is a member of the advisory board of that university's Engineering school. He was draftsman and designing engineer with the Busch Sulzer Company at St. Louis, Mo., from 1930 to 1932 and installed and operated



Gus H. Sample

Diesel engines on large dredging operations from 1932 to 1934. He was sent to the Diesel engine plant of Fairbanks, Morse & Company in Beloit, Wis., in December, 1934, working for the U. S. Navy bureau of engineering as senior inspector, and later as associate mechanical engineer in charge of Navy inspectors in this plant. He resigned from the bureau of engineering in 1937 and returned to the Busch Sulzer organization in St. Louis as executive engineer in charge of engineering in connection with installations for the Maritime Commission and various naval vessels. He also was assistant to the general manager of the plant with jurisdiction over all inspection and engineering, which position he held until his appointment as technical assistant to the director of engineering, Diesel division, American Locomotive Company.

R. K. LeBlond Machine Tool Company.—Lester H. Roemer, for the past few years assistant sales manager of The R. K. LeBlond Machine Tool Company, Cincinnati, Ohio, has assumed the duties of New York District Manager for the company, with headquarters in the Singer Building, 149 Broadway, New York. Mr.

Roemer has been with LeBlond twentythree years, during which time, prior to his work as assistant sales manager, he worked through the various shop departments and on the road as service man and demonstra-



L. H. Roeme

tor in both the United States and Europe, as well as spending approximately ten years in the sales department on estimating and general sales work.

THE EDWARD G. BUDD MANUFACTURING COMPANY has leased, and arranged to transfer its railway passenger-car manufacturing division to a government-owned plant at Bustleton, Pa., in the Philadelphia area. The property is now operated by the Budd Company under a Reconstruction Finance Corporation war-plant facilities lease, sponsored by the Navy Department.

Terms of the lease, which runs for five years, provide that 77 per cent of the space ultimately will be used for car building. A substantial portion of this is presently used in the manufacture of munitions. The company has indicated that it may utilize the remaining 23 per cent, which now is used as a disposal center for surplus property, once production is fully under way on non-war contracts. The war-plant lease is reported to be the largest negotiated to date for the purpose of providing space for peacetime production while work is going ahead on war contracts. Construction of the first railway cars is expected to get under way in the fall.

The new plant comprises a main assembly and manufacturing building covering 24½-acres and an administration building and power plant, with railway sidings run-

ning directly into the main building. The manufacturing building has six bays. T_{W0} main bays, each 1,800 ft. long and 122 ft. wide, will permit the assembling of 80 cars in four lines at one time. Sub-assembly lines and parts fabricating facilities adjoin the main assembly lines.

The administration building contains 45,000 sq. ft. of floor space on two floors and houses administrative offices, personnel offices, medical department, restaurant, and central telephone exchange. Electric power current for the plant, obtained at 66,000 volts, is stepped down at the main sub-station to 13,200 volts and transmitted at this voltage to indoor sub-stations from which it is distributed at 440 volts. Feeders are carried in underground ducts. There are power stands in each column of the two main bays, and a tunnel extends almost the entire length of each bay. Services are drawn from these tunnels by movable stands which straddle the tunnels. Each stand is equipped with compressed-air outlets, water supply, welding power and 440volt, 110-volt and high-cycle power.

HUNT-SPILLER MANUFACTURING COMPANY.—Dan F. Hall has been appointed western sales manager of the Hunt-Spiller Manufacturing Corporation, Boston Mass. Mr. Hall served his apprenticeship as a machinist in the Dubuque, Iowa, shops of the Chicago, Milwaukee, St. Paul & Pacific. He was in the air service in the last world



Dan F. Hal

war, after which he returned to the Milwaukee and was employed as enginehouse foreman at Ottumwa, Iowa, until 1923. He was appointed sales and service engineer (Continued on next left-hand page)



Plant at Bustleton, Pa., leased by the Edward G. Budd Manufacturing Company—The two main bays at the right will house four lines for assembling 80 passenger cars at one time



When the Association of Manufacturers of Chilled Car Wheels adopted Association inspection, a threefold purpose was announced. It was "uniform specifications and uniform product in addition to uniform inspection". Each of these has been translated into an accomplished fact, thanks to the Association's insistence on high product quality as an essential condition of membership.

The same specifications are part of the code of practice to which every member manufacturer must adhere. The same increasingly high inspection standards are applied equally to the wheels of every member company. Seven rigid tests impartially and thoroughly carried out help to assure product uniformity.





ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

THE PARK AVENUE WHY YOUR IS IN . . . AS HOUTH SECTIONED TO STILLING CHICAGO IS. II

Consider To Ashleys Mellows Specifications - Mellows Investigate of Mulforn Product

for the Stover Manufacturing & Engine Co., Freeport, Ill. in 1924, serving in that capacity until January, 1928. He joined the Hunt-Spiller Manufacturing Corporation in February, 1928, as representative in the northwestern territory.

ELECTRIC SERVICE MANUFACTURING COM-PANY.—Hoffman Engineering, 313 South Second Street, Albuquerque, N. M., has been appointed exclusive agent for all products of the Electric Service Manufacturing Company in the states of Arizona and New Mexico.

MALABAR MACHINE COMPANY. — The Malabar Machine Company, Los Angeles, Calif., has appointed Standard Car Sales, Inc., Chicago, its railroad representative for all railroads having sales or mechanical offices in the Chicago territory.

Kelite Products, Inc.—Kelite Products, Inc., manufacturer of industrial chemicals for cleaning and processing, has moved its southwestern headquarters from Houston, Tex., to its new factory at Dallas, Tex. F. L. Alexander has been appointed assistant national director with supervision over the Dallas plant as well as all regional offices in the southwestern division.

CONTINENTAL OIL COMPANY.—Joseph M. Gambill, for the past 15 years railroad lubricating engineer for the Continental Oil Company, has retired.

GENERAL AMERICAN TRANSPORTATION COMPANY.—The General American Transportation Corporation has completed negotiations for the acquisition of the Eclipse Moulded Products Company of Milwaukee, Wis., manufacturers and distributors of plastic products, which will be operated under the same management.

BALDWIN LOCOMOTIVE WORKS.—D. C. Prescott has been appointed to the sales staff of the Baldwin Locomotive Works for the north central district, with head-



D. C. Prescott

quarters in Chicago. Mr. Prescott formerly was mechanical engineer of the Union Pacific at Omaha. He is a graduate of Idaho University with a degree in mechanical engineering and was employed with a number of leading manufacturers prior to joining the Union Pacific in 1936.

Edward H. Schoonmaker, of Syracuse, N. Y., has been appointed sales engineer for the southwestern district office of the



Edward H. Schoonmaker

Baldwin Locomotive Works. Mr. Schoon-maker attended Fenn College at Cleveland, Ohio. He was employed with the Erickson Steel Company at Cleveland and Philadelphia, Pa., prior to joining Baldwin last November as a Diesel service engineer. He had served as a maintenance officer for an armored division at Fort Smith, Ark., and was honorably discharged in March, 1944, after two years of military service.

FIRTH-STERLING STEEL COMPANY,— George W. Frick has been appointed general sales manager and A. R. Zapp carbide



G. W. Frick

products manager of the Firth-Sterling Steel Company.

George W. Frick has been identified with the metal-working industries in various capacities since 1913. After serving more than two years with the Marines in World War I, he became a sales engineer of tool and die steels. As a special representative of Crucible Steel Company of America for five years, he promoted nationally the use of alloy steels and stainless steels. In 1929 he joined Firth-Sterling, and was appointed manager of the Ohio Division in 1930, serving in that capacity until 1941, when he was moved to McKeesport as manager of the Firthrite division, having charge of the development and marketing of sintered

carbide for cutting tools both in this country and for export.

A. R. Zapp, an officer in the Navy in the first World War, received advanced engineering training at Stevens Institute of Technology and Annapolis. While associated with Union Wire Die Company he participated in the evolution and development of sintered carbide dies. Mr. Zapp was appointed manager of Firth-Sterling's Firthaloy division in 1932. In cooperation with the Industry Committee on Steel Car-



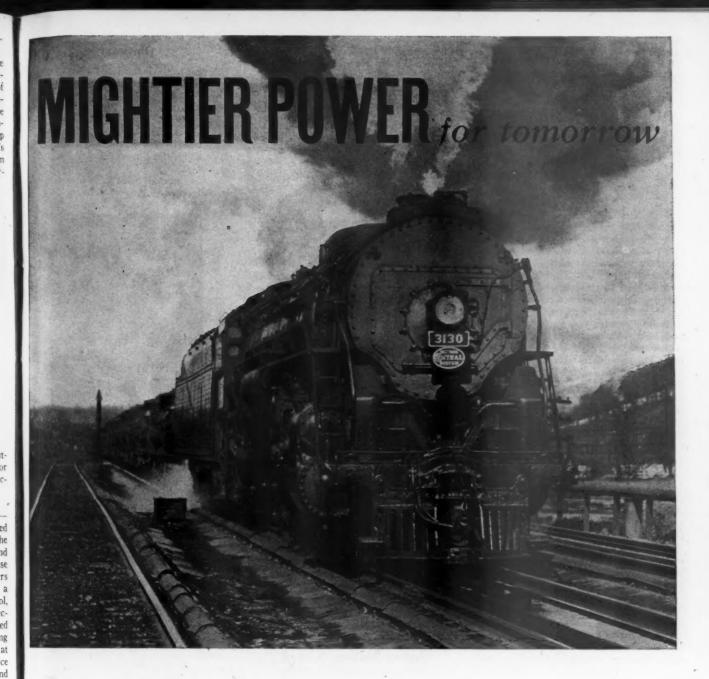
A. R. Zapp

tridge Cases, he is credited with contributing to the development of special dies for brass and steel cartridge case manufacturing.

WESTINGHOUSE ELECTRIC CORPORATION. Harry L. Huntley has been appointed headquarters repair sales manager of the thirty-four plants of the manufacturing and repair department of the Westinghouse Electric Corporation with headquarters in Pittsburgh, Pa. Mr. Huntley is a graduate of the Bliss Electrical School, Washington, D. C., with a degree in electrical engineering (1922). He joined Westinghouse in 1926 in service engineering and sales work in the service department at Philadelphia, Pa. He opened the service shop at Wilkes-Barre, Pa., in 1927, and remained there as manager until 1939, when he was transferred to Fairmont, W. Va. to open and manage the manufacturing and repair plant. He was transferred to Pittsburgh in 1940 to organize and manage the repair and renewal parts sales division for the central district, in which capacity he served until his new appointment.

OLD DOMINION IRON & STEEL CORP .- The Old Dominion Iron & Steel Corp. has been newly chartered to acquire all physical properties of the Old Dominion Iron & Steel Works, Inc., Belle Isle, Richmond, Va., for the manufacture of welded steel products. The new officers include G. E. Hoppe, Jr., president; A. A. Adcock, vicepresident and R. A. Trombold, secretarytreasurer. All were formerly with the Richmond Engineering Company. Present operations, which have been on a limited scale for several years, will be continued while buildings and equipment are being made ready for the new product. All per-

(Continued on next left-hand page)



AMONG the many improvements in railroad transportation in recent years, unquestionably the most outstanding is the greatly increased speed in the movement of heavy freight.

This has been made possible through greatly increased efficiency in motive power, as is exemplified in the operation of Lima Locomotives.

Fleets of these locomotives, now playing a vital role in wartime service, will be ready to meet tomorrow's demands to haul heavier trains, at higher speeds, and at lower costs.

LIMA LOCOMOTIVE WORKS



LOCOMOTIVE WORKS INCORPORATED, LIMA, OHIO

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neer 945 sonnel will be retained, including R. H. Wayt, vice-president and general manager of the old corporation, and John C. Webb, superintendent of the rolling mills.

AMERICAN SEATING COMPANY.—Hugh G. Bersie has been appointed product manager of the American Seating Company's transportation seating division to succeed O. M. Dunton. During the past six months, Mr. Bersie has been making special studies in the transportation field as a member of the company's research department. Mr. Dunton will continue with special contacts among coach builders.

H. K. PORTER COMPANY.—Harold L. Kennedy has been appointed district sales manager of the H. K. Porter Company of Pittsburgh, Pa., with headquarters in a new office established by the company at 513 Colorado building, Washington, D. C. He will handle sales for Porter locomotives and Mount Vernon freight cars and also will be, in charge of the distribution of other Porter products. Excepting for service as a captain in the U. S. Army Air Corps during 1942 and 1943, Mr. Kennedy has been employed since 1922 in the railroad transportation department of the Fruit Growers Express Company, Washington, most recently as assistant purchasing agent.

Ashton Salvage Company.—J. W. Motherwell, president and treasurer, has been elected chairman of the board of the Ashton Valve Company to succeed Ellery Peabody, president of the company for the past 35 years and chairman of the board for the past two years, who is retiring at his own request. William P. Husband, Jr., formerly commissioner of banks of Massachusetts, has been elected president and treasurer.

WILSON WELDER & METALS COMPANY.— The Graybar Electric Company has been appointed exclusive distributor of the Wilson Welder & Metal Co.'s brand of electrodes in areas served by Graybar's Cincinnati and Cleveland, Ohio, and Pittsburgh, Pa., offices.

Carnegie-Illinois Steel Corporation.

—Albert F. Steubing has been appointed assistant to the manager of sales, high strength steel division, of the Carnegie-Illinois Steel Corporation. Mr. Steubing joined the United States Steel Corporation in New York in 1934. He was transferred to the Carnegie-Illinois organization in 1938 where he has served as development engineer in the market development division of the sales department. Mr. Steubing was formerly in the employ of the Pennsylvania and the Chicago, Rock Island & Pacific.

THOMAS MACHINE MANUFACTURING COMPANY.—The Thomas Machine Manufacturing Company, Pittsburgh, Pa., has announced the appointment of sales agencies for 10 cities, completing its sales network for the United States. The new agents are the Northern Machinery & Supply Co., Minneapolis, Minn.; Richard Ives Co., Denver, Colo.; J. M. Grisley, Salt Lake

City, Utah; Dawson Machinery Co., Seattle, Wash.; Harron, Richard & McCone Co., San Francisco and Los Angeles, Cal.; C. J. Harter Machinery Co., Houston and Dallas, Tex.; Robert R. Stephens Machinery Co., St. Louis, Mo.; George E. Zweifel & Co., Portland, Ore.; Bryant Machinery & Engineering Co., Milwaukee, Wis., and the Roland Company, Nashville Tenn.

PULLMAN-STANDARD CAR MANUFACTURING COMPANY.—R. M. Fox has been appointed manager of works of the Pullman-Standard Car Manufacturing Company plant at Butler, Pa.

United States Steel Corporation.— David F. Austin, vice-president in charge of sales of the Carnegie-Illinois Steel Corporation, has been appointed acting vicepresident, sales, or the United States Steel Corporation. Avery C. Adams, vice-president, sales, has resigned.

CUTLER-HAMMER, INC.—F. R. Bacon has been elected chairman of the board of directors of Cutler-Hammer, Inc.; H. F. Vogt, chairman of the Executive Committee and vice-president and treasurer; G. S. Crane, president; J. C. Wilson, vice-president and secretary; P. B. Harwood, vice-president in charge of engineering, and P. S. Jones, vice-president in charge of sales.

ALLEGHENY LUDLUM STEEL CORPORA-TION.—The Allegheny Ludlum Steel Corporation, Brackenridge, Pa., has available, for use upon request, a new 16-mm. sound and color film entitled "The Manufacture of Dies." The film has a running time of 10 min. It describes the manufacture of lamination dies from Huron high-carbon high-chromium die steel, supplementing others already available covering stainless, tool, and electrical steels.

Spring Makers Named in an Anti-Trust Suit

A CIVIL suit charging 10 manufacturers, a patent holding company, and the Railway & Industrial Spring Association with conspiracy to suppress competition in the manufacture and sale of railway springs and spring plates, in violation of the Sherman Anti-trust Act, was filed June 20 by the Department of Justice in the federal district court at Hammond, Ind., according to Attorney General Biddle.

The defendants named in the suit, in addition to the trade association are: American Locomotive Company, New York; American Spiral Spring & Manufacturing Company, Pittsburgh, Pa.; American Steel Foundries, Hammond, Ind.; Baldwin Locomotive Works, Eddystone, Pa.; Crucible Steel Company of America, New York; Fort Pitt Spring Company, McKees Rocks, Pa.; Pittsburgh Spring & Steel Company, Pittsburgh; Union Spring & Manufacturing Company, New Kensington, Pa.; Symington-Gould Corporation, Rochester, N. Y.; Universal Railway Devices Company, Chicago; and Pittsburgh Steel Foundry Corporation, Glassport, Pa.

Obituary

MYRON J. CZARNIECKI, vice-president in charge of sales for the A. M. Byers Company, died on June 18. Mr. Czarniecki was 53 years of age. He joined the Byers organization in 1913 and was appointed manager of the company's Chicago sales office in 1919. He was transferred to New York in 1920 and managed that office until he was returned to Pittsburgh in 1925 as assistant general manager of sales. He was advanced to general manager of sales



M. J. Czarniecki

in 1930 and elected vice-president in charge of sales in 1934. He was a member of the American Iron & Steel Institute, the American Petroleum Institute, the American Supply & Machinery Manufacturers Association, the Railway Business Association, the Engineers Society of Western Pennsylvania, and other civic associations.

SAMUEL A. SPALDING, vice-president and chief engineer of Gibbs & Hill, Inc., consulting engineers, New York, died May 25 at his home in New Canaan, Conn. Mr. Spalding was 72 years of age. He was a graduate of Tufts College with a degree in electrical engineering in 1894. He began his career with the Brooklyn Rapid Transit



Samuel A. Spalding

Company and later joined the staff of the engineer of electric traction of the New York Central in connection with the electrification from New York to Harmon

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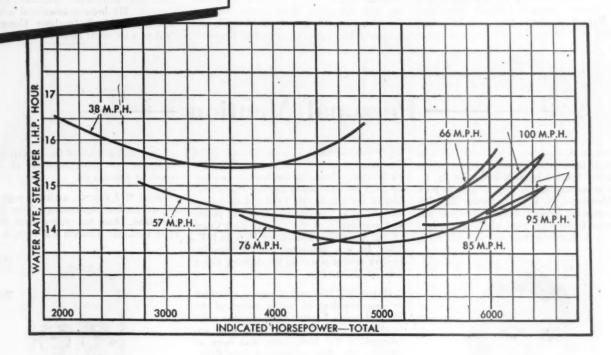
STEAM PER HORSEPOWER HOUR

The Franklin System of Steam Distribution

applied to

The Pennsylvania Railroad's

T-1 Locomotives



N a paper read before the New York Railroad Club on May 17, 1945, describing the Pennsylvania Railroad's T-I Locomotive, Chief Engineer Ralph P. Johnson of the Baldwin Locomotive works stated:

"The minimum water rate was 13.6 pounds at a speed of 76 miles per hour and 20 percent cut-off. In most of the tests the water rate was between 14 and 15.5 pounds.

"In 40 years of testing on the Altoona Test Plant, this locomotive gave the lowest water rate."



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Mr.

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FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK . CHICAGO

In Canada: FRANKLIN RAILWAY SUPPLY COMPANY, LIMITED, MONTREAL

He became superintendent of power of the Brooklyn Rapid Transit and in 1908 joined the staff of the chief engineer, electric traction and station construction of the Pennsylvania, under George Gibbs and E. R. Hill, with whom he continued when they were later incorporated as Gibbs & Hill, Inc. He specialized in power-house design and was appointed chief engineer of the firm, which has handled a large portion of this country's electrification, including the Pennsylvania's original electrifica-tion from Long Island City and New York to Manhattan transfer and Philadelphia suburban; the Norfolk & Western's Elkhorn grade; the Virginian over the Alle-ghenies from Mullens to Roanoke, Va.; the Illinois Central's Chicago suburban; the New York Connecting Railroad's Bay Ridge; the Pennsylvania's through electrification from New York to Washington and Harrisburg, Pa. and extensions on the New York, New Haven & Hartford. During the second world war he was active as chief engineer in the design and construction of work connected with the war effort.

JOHN B. STRAUCH, who was chairman of the board of the National Bearing Metals Corporation, until last January when the firm became the National Bearing Division of the American Brake Shoe Company, died at St. Louis, Mo., on June 22.

H. J. TIERNEY, president of the H. J. Tierney Supply Co., St. Louis, Mo., died on June 10. Mr. Tierney was born at Junction City, Kan., on July 14, 1871, and entered railway service with the Missouri-

Kansas-Texas on March 4, 1887, as a machinist, later serving as chief draftsman. Some time later he was appointed mechanical engineer and superintendent of the car department. In 1918, Mr. Tierney entered the railway supply business which he operated up to the time of his death.

CARL F. HANSON, chief consulting engineer of the Irvington Varnish & Insulator Company, passed away at his home in Westfield on April 27, 1945, after a brief illness. Mr. Hanson received his B. S. and M. S. degrees in electrical engineering at the University of Kansas. He was a member of The American Society for Testing Materials and The National Research Council. He became associated with Irvington Varnish & Insulator Company in 1930 as a technical director.

Personal Mention

FRANK S. ROBBINS, whose retirement as general superintendent motive power of the Atlantic Coast Line at Wilmington, N. C., was announced in the July issue, was born at Menantico, N. J., on December 22, 1880. He attended Newark Technical School and Purdue University, from which he received his B. S. degree in mechanical engineering



Frank S. Robbins

in 1906. He entered railroading in 1900 as a machinist apprentice in the service of the Pennsylvania, and from 1906 to 1907 served as a special apprentice in the Altoona shops. From 1907 to 1908 he was on special duty, and in 1909 became motive-power inspector at Renovo, Pa. In 1910 Mr. Robbins was appointed assistant master mechanic of the Monongahela division; in 1911, assistant road foreman of engines, Renovo division; in 1913, assistant general foreman of the Pitcairn shops, and in 1914 assistant master mechanic of the Pittsburgh division. After serving in the United States Army, Engineer Officers Reserve Corps, from 1916 to 1918, during which time he rose to the rank of major, Mr. Robbins returned to the position of assistant master mechanic of the Pittsburgh division, and in 1919 became master mechanic. In 1921 Mr. Robbins left

the Pennsylvania and joined the Inter-allied Technical Board, Trans-Siberian Railways, at Harbin, China, as mechanical adviser. In 1923 he was named railway representative of the Pittsburgh Testing Laboratory. He served as superintendent, motive power and machinery, of the Florida East Coast at St. Augustine, Fla., from 1926 to 1937, when he was appointed general superintendent motive power of the Atlantic Coast Line at Wilmington.

HAROLD C. WRIGHT, whose appointment as superintendent of motive power of the Pennsylvania's Eastern Ohio division, with headquarters at Pittsburgh, Pa., was announced in the June issue, was born at Altoona, Pa. After graduating from Pennsylvania State College he entered railroading as a storehouse attendant in the employ of the Pennsylvania at Altoona in 1911. In 1921 he was advanced to the position of motive power inspector, and three years later became gang foreman at Olean, N. Y.



Harold C. Wright

Mr. Wright was appointed assistant master mechanic of the Pittsburgh division in 1935, and, following service on several other divisions, master mechanic of the Williamsport division in 1940. He transferred to Altoona in 1942 and remained there until his appointment as superintendent of motive power at Pittsburgh.

Louis E. Laurent, assistant engineer of the mechanical department of the Erie at Cleveland, Ohio, has retired after 28 years of service. Mr. Laurent was born in Paris,



L. E. Laurent

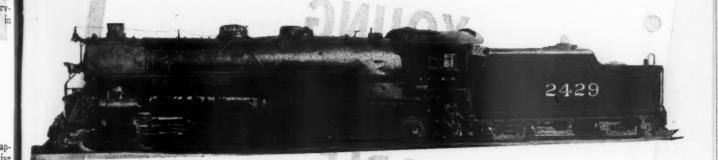
France, on June 30, 1874. He received his engineering education at New York City College and Princeton University, and before joining the Erie in 1917, worked as a mining engineer in Mexico for several years. His career with the Erie began as an inspector in the engineering department. He subsequently became assistant engineer in the engineering and mechanical departments.

O. Homer Bryan, locomotive engineman on the Western division of the Western Pacific, has been appointed assistant to the general manager, with headquarters at San Francisco, Calif.

E. L. Banion, general foreman of the Atchison, Topeka & Santa Fe at Needles, Cal., has been appointed assistant division superintendent, with the same headquarters.

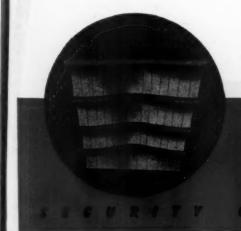
FIRST SECURITY CIRCULATORS

WERE INSTALLED 11 YEARS AGO



IN August, 1934, the first Security Circulators were placed in operation in Locomotive 2429 of the Illinois Central. Since that time over 5600 Circulators have been ordered by 37 different railroads.

Security Circulators permit the use of a 100% arch and lengthen the life of the arch brick, at the same time that they improve the circulation of water over the crown sheet and in side water-legs.



AMERICAN ARCH COMPANY, mc.

IT'S A GREAT NEW DAY FOR RAILROADING

YOUNG enough to be new

ABLE

to do the job

and

WILLING

to work

GENERAL MOTORS
LOCO MOTIVES

IT'S A GREAT NEW DAY FOR RAILROADING

Eight

General Motors Diesel

passenger locomotives

on the L & N

were assigned a total of

1,519,973 miles

for 1944.

They actually operated

a total of 1,494,924 miles

or 98.4% of their assignment.

That's an average of

126,664 miles per month;

averaging 15,833 miles

per locomotive.

ON TO FINAL VICTORY * BUY MORE WAR BONDS

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS CORPORATION

LA GRANGE, ILL.

Angus Hugh Williams, general supervisor of apprentice training of the Canadian National system, with headquarters at Montreal, Que., has retired on pension after more than 38 years of service. Mr. Williams was born at Goldensville, N. S., on June 29, 1880, and after serving for seven years with the Blue Nose Gold Mining Co., and working as a fitter and later as a



A. H. Williams

machinist in the employ of the Dominion Iron & Steel Co. he joined the Canadian Northern (now the Canadian National) as a machinist at Winnipeg in 1907. There was then no coordinated system of apprentice training, and Mr. Williams was soon allowed several hours away from his job as a machinist to help the apprentices. In 1916 he became an apprentice instructor, and five years later was appointed supervisor of apprentices. In 1930 Mr. Williams moved to Montreal as general supervisor of apprentice training for the system, and was responsible for reorganizing the training plan and setting up a uniform system to cover eleven different trades.

O. R. Pendy, general enginehouse foreman of the New York, Chicago & St. Louis at Conneaut, Ohio, has been appointed assistant chief mechanical officer, with headquarters at Cleveland, Ohio. Mr. Pendy was born at Oil City, Pa., on December 17, 1900, and is a graduate of Penn State University (1924). After graduation he entered the mechanical department of the Nickel Plate as a special apprentice. During 1927 he was a dynamometer car operator, and from 1929 to 1931 machinist and gang leader at Conneaut. In 1931 he became mechanical inspector for the superintendent of motive power at Cleveland; in 1933, fuel supervisor, and in December, 1936, general enginehouse foreman at Conneaut.

W. W. Lyons, master mechanic of the Western division of the Atchison, Topeka & Santa Fe at Dodge City, Kan., has been appointed acting mechanical superintendent of the Northern district, with headquarters at La Junta, Colo.

C. L. WILSON, superintendent motive power of the Elgin, Joliet & Eastern at Joliet, Ill., has retired after 47 years of service. Mr. Wilson was born at Joliet. He entered the service of the E. J & E. on November 25, 1897, as a machinist helper.

On March 3, 1898, he became a locomotive fireman, and on January 8, 1903, locomotive engineer. He was appointed assistant train rules examiner on September 21, 1918; traveling engineer on February 1, 1919; air-brake supervisor on January 15, 1925; on August 1, 1933, master mechanic at Joliet, and in May, 1938, superintendent of motive power.

P. J. Danneberg, mechanical superintendent of the Northern district of the Atchison, Topeka & Santa Fe at La Junta, Colo., has been transferred to the Southern district, with headquarters at Amarillo, Tex.

E. G. EKLUND, superintendent of motive power and rolling stock of the Rutland at Rutland, Vt., has been relieved of his duties as superintendent in order that he may devote his full time to the latter position.

J. S. THORP, electrical engineer of the Delaware, Lackawanna & Western at Hoboken, N. J., has been appointed assistant to the vice-president.

George Alexander Howard, supervisor, accident prevention, of the Western region of the Canadian National, has been appointed general supervisor of apprentice training for the system, with headquarters at Montreal, Que. Mr. Howard was born in England on October 30, 1903, and came to Canada in 1914. He began his apprenticeship in the Canadian National's Fort Rouge shops, Winnipeg, Man., in 1920, and



G. A. Howard

served as a machinist from 1926 to 1930. Early in 1931 he was appointed apprentice instructor at Fort Rouge, transferring to Transcona, Man., in 1936. He became supervisor of apprentices, Western region, in 1939, and in 1943 was assigned to organize safety work on the Western region as supervisor, accident prevention.

NORCUM ARTHUR PEEBLES has been appointed electronic engineer of the Atlantic Coast Line with headquarters at Wilmington, N. C..

F. E. Edwards, assistant superintendent, electric equipment, of the New York Central at Harmon, N. Y., has been appointed superintendent, electric equipment, with headquarters at Harmon.

Andrew B. Costic, assistant electrical engineer of the Delaware, Lackawanna & Western, has been appointed electrical engineer at Hoboken, N. J.

Master Mechanics and Road Foremen

W. D. Quarles, master mechanic of the Richmond and Norfolk districts of the Atlantic Coast Line at Rocky Mount, N. C., has been appointed Diesel master mechanic for the system with headquarters at Wilmington, N. C. Mr. Quarles was born in Richmond, Va., July 11, 1892. He attended the Richmond public schools and the Virginia Mechanical Institute, where



W. D. Quarles

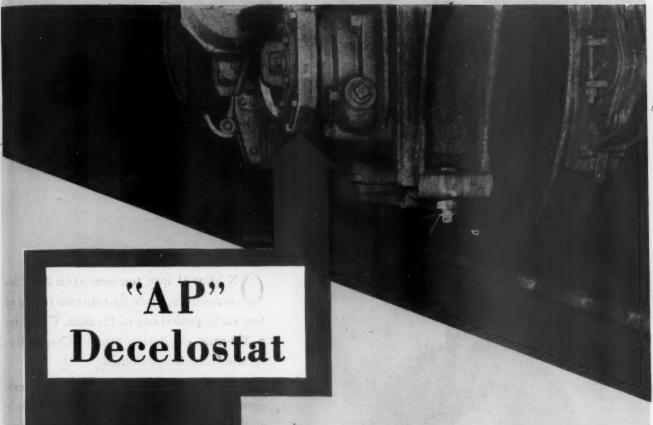
he studied electrical engineering. From 1907 to 1910, inclusive, he served an apprenticeship in the Richmond branch of the American Locomotive Works, in the electrical maintenance department. Mr. Quarles became fireman in the employ of the Atlantic Coast Line, on February 11, 1911. He became a locomotive engineer on July 16. 1917; fuel instructor between Richmond and Florence on November 1, 1918; road foreman of engines, Wilmington district, September 1, 1919; road foreman of engines, Charleston district, in January, 1933, and on December 1, 1936, road foreman of engines, Richmond district, with headquarters at Rocky Mount. On April 1, 1939, Mr. Quarles was appointed general mechanical instructor for the entire system. He became master mechanic of the Richmond and Norfolk districts on November 1, 1944, and Diesel master mechanic for the system on July 1, 1945.

J. A. PARRISH, general foreman of the Louisville & Nashville at Montgomery. Ala., has been appointed master mechanic of the Louisville Terminals and Louisville division, with headquarters at Louisville, Ky.

H. G. STUBBS, master mechanic of the Southern at Atlanta, Ga., has retired after 48 years of service.

G. E. Algoe, assistant road foreman of engines of the Maryland division of the Pennsylvania, has been appointed road foreman of engines of the Toledo division, with headquarters at Toledo, Ohio.

Sentry on Wheels





Softens the Brake When Wheel Slip Impends

THE Decelostat is a sentry that is always at its post—on the wheel—ever on the lookout for irregularity in wheel-rail adhesion.

When brakes are applied it measures rate of retardation. If slippery rail is encountered the Decelostat won't let the wheel slip into a slide. It eases up on the brake, promptly—before the slide can develop. This is done in less than a second.

Braking pressure is softened—but only for the moment, and only on the affected wheels. Then the braking pressure is restored to the existing train level.

Westinghouse Air Brake Company

Wilmerding, Pa.

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the



Cuba Consolidated Gets New ALCO Fleet



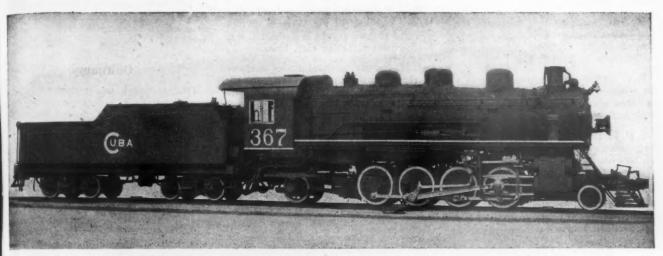
HEAD-ON VIEW OF THE "367"—one of the ten locomotives recently delivered by American Locomotive Company to the Consolidated Railroads of Cuba.

ON May 31 last, ten new ALCO 2-8-2 locomotives, made up into two trains of five each, pulled out of Havana, Cuba, on a 338-mile exhibition run to Camaguey, on the Cuba Consolidated.

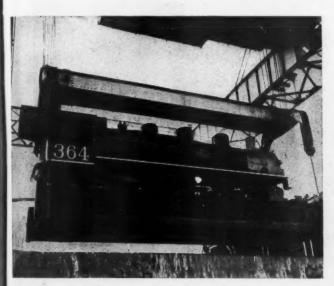
At an impressive ceremony, the President of the Republic, and other high officials of the Cuban Government, inaugurating the induction of these locomotives into service, congratulated the railroad upon their acquisition, to the benefit of all Cuba.

In a letter to the American Locomotive Company, the president of the Consolidated Railroads of Cuba cited Cuba's special needs, and expressed confidence in these new ALCO units "...confidence springing from our experience with others purchased from you in the past."

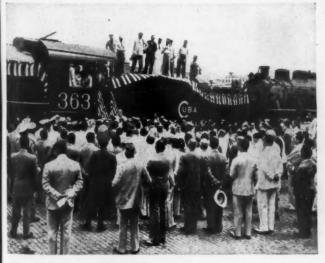
Here, and in many countries, more, and still more, locomotives are, and will be, needed. Conditions to be met, types to be supplied, will vary widely. It is good to feel that American Locomotive Company commands — and will uphold — the confidence of railroad men everywhere in its ability to design and build locomotives that answer every requirement completely.



ONE OF TEN ALCO LOCOMOTIVES built for the Consolidated Railroads of Cuba.



DEBARKATION — first of the ten ALCO locomotives is hoisted from ship's hold in Cuba.



WELCOME TO CUBA —the new ALCO locomotives are inducted into the service of railroad and nation by the President of Cuba.



AT CAMAGUEY —two trains of five new ALCO locomotives each arrive at Camaguey headquarters.



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- W. E. Hunter, master mechanic, with headquarters at Covington, Ky., and De-Coursey, has retired after more than 40 years of service.
- R. AMUNDSEN has been appointed division master mechanic of the St. Lawrence division of the Canadian National, with headquarters at Turcot, Que.
- R. J. Dunn, acting master mechanic of the Union Pacific at Kansas City, Kan., has been appointed district foreman, with headquarters at North Platte, Neb.
- S. H. DuBose, who temporarily occupied the position of master mechanic at Somerset, Ky., has returned to his post as master mechanic at Ludlow, Ky.
- JOSEPH T. CORDER, district foreman of the Union Pacific at North Platte, Neb., has been promoted to the position of general foreman, locomotive department, at North Platte.
- K. A. Lentz, who temporarily occupied the position of master mechanic of the Southern at Birmingham, Ala., has returned to the position of master mechanic he formerly held at Somerset, Ky.
- P. C. Branch, who temporarily occupied the position of master mechanic of the Southern at Ludlow, Ky., has returned to the position of general foreman he formerly held at Birmingham, Ala.
- W. A. SHIELDS, road foreman of engines of the Chicago Terminal division of the Pennsylvania, has been appointed road foreman of engines of the Philadelphia division.
- J. L. PARKER, assistant master mechanic of the Lake division of the Pennsylvania, has been appointed master mechanic of the Chicago Terminal division, with headquarters at Chicago.
- OTTO STURM, assistant master mechanic of the Delaware, Lackawanna & Western at Scranton, Pa., has been appointed master mechanic, with jurisdiction over the Scranton division, Bloomsburg branch, and Syracuse and Utica branches.
- N. M. Kerr, master mechanic of the St. Lawrence division of the Canadian National at Turcot, Que., has retired.
- R. L. TURNER, master mechanic of the Southern at Asheville, N. C., has been transferred to the position of master mechanic at Atlanta, Ga.
- A. R. SYKES, master mechanic of the Southern Kansas-Central divisions of the Missouri Pacific, who has been on leave of absence since last December, has returned to his position and his headquarters at Coffeyville, Kan.
- J. N. Fox, superintendent of equipment of the Illinois Central at Chicago, has been appointed master mechanic at Memphis, Tenn.
- C. H. SUITS, road foreman of engines of the Union Pacific at North Platte, Neb., has been transferred to the position of road foreman of engines at Cheyenne, Wyo.

- A. G. WALDRUPE, shop superintendent of the Southern at Knoxville, Tenn., has been appointed master mechanic at Bristol, Va.
- D. J. EVERETT has been appointed acting master mechanic of the Western division of the Atchison, Topeka & Santa Fe, with headquarters at Dodge City, Kan.
- J. M. Jeffrey, assistant master mechanic of the Illinois Central at Markham, Ill., has been appointed master mechanic, with headquarters at Centralia, Ill.
- F. T. Walden has returned to his position as master mechanic of the Southern at Birmingham, Ala., after a leave of absence.
- C. T. EAKER, general foreman of the Illinois Central at Memphis, Tenn., has been appointed master mechanic, with headquarters at Paducah, Ky.
- H. N. SEELY, master mechanic of the Illinois Central at Centralia, Ill., has retired because of sickness.
- R. W. Ellis, master mechanic of the Illinois Central at Memphis, Tenn., has been transferred to the position of general master mechanic at Waterloo, Iowa.
- F. E. KIMBALL, general foreman of the Southern at Asheville, N. C., has been promoted to the position of master mechanic at Asheville.
- CHARLES S. WILLIAMS has been appointed general foreman, Diesel locomotive shop of the Delaware, Lackawanna & Western, with headquarters at Scranton, Pa. Mr. Williams will continue the supervision of automatic cab signal equipment and electrical maintenance features of locomotives.

Shop and Enginehouse

E. A. MURRAY, shop superintendent of the Chesapeake & Ohio at Huntington, W. Va., who has retired as announced in the June issue, was born on September 1, 1876, at Staunton, Va. He received a public-



E. A. Murray

school education and on December 11, 1891, entered the employ of the Chesapeake & Ohio as a laborer at Clifton Forge, Va. He later became a machinist apprentice and subsequently served as a machinist, loco-

motive fireman, and gang foreman until 1903 when he was promoted to the position of general foreman, locomotive department. In 1909 he was appointed master mechanic at Clifton Forge and in 1921 shop superintendent at Huntington. He retired on April 15.

Obituary

THOMAS ROOPE, who retired in 1926 as superintendent of motive power of the Chicago, Burlington & Quincy, Lines West, died at Lincoln, Neb., on June 20.

MATTHEW SCOTT SLOAN, chairman of the board and president of the Missouri-Kansas-Texas Lines and subsidiaries, died of a heart attack on June 14 in New York Hospital, New York. He was 63 years of age. Mr. Sloan began his career with the General Electric Company at Schenectady, N. Y., in 1902. Four years later he became chief engineer of the Birmingham Railway Light & Power Co., rising to the position



Matthew Scott Sloan

of assistant to the president. He was appointed vice-president and general manager of the New Orleans Railway & Light Co., in 1914 and in 1917 went to New York as assistant to the vice-president and general manager of the New York Edison Company. He was elected president of the Brooklyn Edison Company in 1919 and when the Consolidated Gas Company purchased the Brooklyn firm in 1928, he was elected president of the New York Edison Company and the three other neighboring utility companies. He resigned his Edison positions in 1932 and two years later assumed leadership of the Katy system.

In Military Service

ORDER OF THE BRITISH EMPIRE CONFERRED ON GEN. GRAY

Brig. Gen. Carl R, Gray, Jr., director general of the Military Railway Service, and former executive vice-president of the Chicago, St. Paul, Minneapolis & Omaha, has been made Honorary Commander, Order of the British Empire, Military division. The citation conferring this honor reads as follows:

(Continued on next left-hand page)



For main-line service the Pennsylvania chooses

"UNION" I.T.C.



"UNION" I. T. C. ON THE PENNSYLVANIA

- 1940: Columbus, Ohio. One-way equipment in hump yard.
- 1942: Indianapolis, Ind. One-way equipment in hump yard.

 Trenton, N.J. to Phillipsburg. Twoway equipment for road service on
 - way equipment for road service on Belvidere branch.
- 1943: Altoona, Pa. One-way equipment in two hump yards. Harrisburg, Pa. (Enola Yards). One-way equipment in two hump yards.
 - Pitcairn, Pa. One-way equipment in hump yard.
- 1944: Pittsburgh, Pa. (Strip District).
 Two-way equipment in an industrial switching district.
- 1945: Pittsburgh, Pa. to Harrisburg. Under construction.

Train Communication equipment is now under construction on two of the busiest divisions of the Pennsylvania Railroad between Harrisburg and Pittsburgh.

The "Union" Inductive system has been chosen because the Pennsylvania knows from its own experience that "Union" I.T.C. meets railroad needs. "Union" I.T.C. was installed in the Columbus, Ohio yard of the Pennsylvania in 1940; today this system is in use in eight of the Pennsylvania's busiest yards.

For nearly three years, "Union" I.T.C. has been in road service between Phillipsburg and Trenton, on the Belvidere branch.

This record of satisfactory performance made "Union" I.T.C. the inevitable choice when the Pennsylvania decided to use Train Communication in main-line service. Two-way equipment will be installed on approximately 275 freight and passenger locomotives, 90 cabin cars and 6 towers. This will serve two four-track divisions totaling 245 road miles.

Recently, train communication and its relation to railroad operation were discussed at the New York Railroad Club. We will be glad to send you a reprint of the proceedings.

UNION SWITCH & SIGNAL COMPANY

SWISSVALE, PA.

NEW YORK

CHICAGO

ST. LOUIS

SAN FRANCISCO



"The repair of railroads in Italy and the organization of traffic on them were among the most important governing factors limiting the pace of the Allied advance. Brig. Gen. Carl R. Gray brought to this task first-class ability, wide experience and great driving power. Under his leadership, American and British resources were successfully combined for the fulfillment of the common purpose. The allied armies in Italy owe to General Gray a great debt for the magnificent work which he did while Director General of the Military Railways there."

EQUIPMENT SECTION, GENERAL HEADQUAR-TERS, MILITARY RAILWAY SERVICE

The uniformed men shown in the group photograph are officers of the original and present equipment section of General Head-quarters, Military Railway Service, in the European Theater of Operations. The Headquarters has charge of planning and control of Military Railway Service and general jurisdiction over the entire operation—more than 2,000 steam locomotives, 200 Diesels, 50 hospital trains, and 40,000 freight cars of the U. S. Army, as well as 30.000 men.

Left to right, the officers are: Maj. Horace G. Moore, general car superintendent (formerly with the Atlantic Coast Line at Jacksonville, Fla.); Col. Frank H. Hosack, director of equipment (formerly mechanical superintendent, Missouri Pacific, St. Louis, Mo.); Col. Walter M. English, general superintendent motive power (formerly superintendent motive power, Chi-

works, which Headquarters reports to be "about equal in size" to the Baldwin plant at Philadelphia.

The German plant was a "debris-strewn mass of twisted girders, crumpled machinery and shattered locomotives and cars," when the 757th moved in. But the job of hastening the project goes on, and with most of the 4,000 employees who worked there before U. S. occupation, Headquarters recently reported. While some of the

lathes and machinery are said to be intact, there is evidence of hastily abandoned work, the report states, and "all along the assembly line are locomotive frameworks, gun mounts and cannon undergoing the boring process."

Executive officer of this outfit is Capt. Charles E. Smith, of Devon, Pa., former foreman of the Philadelphia Terminal Division of the Pennsylvania, at Philadelphia,

Trade Publications -

Copies of trade publications described in the column can be obtained by writing to the manufacturers, preferably on company letterhead, giving title. State the name and number of the bulletin or catalog desired, when it is mentioned.

"THE SAXE WELDED ERECTION SYSTEM."

—J. H. Williams & Co., 400 Vulcan street,
Buffalo, N. Y. Four-page bulletin No. 4
shows how the Saxe system works and
discusses its advantages.

SHOP EQUIPMENT.—The Watson-Stillman Co., Roselle, N. J. Bulletin No. 510-A illustrates and describes W-S line of hydropneumatic pit jacks, including drop-pit tables, in types of the hand-pump-operated telescope, air-engine driven, and drop-pit table models, also special types. Bulletin No. 560-A describes such miscellaneous hydraulic equipment for railroad shops as crank-pin and forcing presses, pulling jacks, and rail benders.

DIESEL-ELECTRIC MAINTENANCE EQUIP-MENT.—Whiting Corporation, Harvey, Ill. Sixteen-page illustrated book, "Increased Availability for Your Diesel-Electric Power," outlines the range of Whiting equipment for large or small terminals, for the entirely new shop, and for changed-over shops where facilities are being adapted to the requirements of Diesel-electric power.

CARE AND MAINTENANCE OF BOILER TUBING.—Steel and Tubes Division, Republic Steel Corporation, 224 East One Hundred Thirty-First Street, Cleveland 8, Ohio. Card, for wall nailing, gives information on the care and maintenance of boiler tubing as prepared by the chief engineer of a leading boiler insurance company.

ARC WELDING TOOL AND DIE STEELS.—
C. E. Phillips & Company, 2750 Poplar street, Detroit 8, Mich. "Arc Welding in the Maintenance and Construction of Tools and Dies"—a handbook of engineering data, welding procedures and heat-treatment procedures for tool and die steels.

Tube Cleaners.—Elliott Company, Jeannette, Pa. Four-page, illustrated Bulletin Y-20. Describes the Lagonda type tube cleaners and summarizes the various types of Elliott cleaner motors and cutter heads developed for special locomotive tubes and pipes.

HIGH-STRENGTH STEELS.—Republic Steel Corporation, Advertising Division, 3100 East Forty-Fifth street, Cleveland 4, Ohio. Four-page folder, Form 434, gives general characteristics, chemical composition, and physical properties of Republic Aldecor, Republic Cor-Ten, and Republic Double-Strength Steels.

"SPEED SURFACE-GRINDING SET-UPS."—George Scherr Company, 200 Lafayette Street, New York 12. Eight-page folder illustrates actual applications of Magne-Blox products employed to hold various types of work for surface-grinding operations. Features also a new service; namely, the production of special sizes of Magne-Blox parallels, v-blocks and angle irons, as well as other shapes and forms to fit any type of magnetic chuck.



cago, Indianapolis & Louisville, Lafayette, Ind.); and Lt. Col. James H. Heron, general mechanical engineer (formerly with the Great Northern at St. Paul, Minn.).

757TH RAILWAY SHOP BATTALION

When Lt. Col. John W. Moe, former C. M. St. P. & P. enginehouse foreman and his Milwaukee-sponsored 757th railway shop battalion moved into Germany after 10 months at Cherbourg, they were confronted by the "huge task" of taking over the damaged Henshall & Sohn locomotive

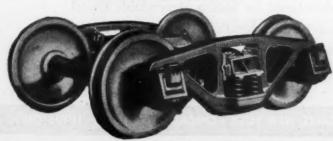
RECTIFIERS.—Fansteel Metallurgical Corporation, North Chicago, Ill. "Selenium Rectifiers," a 14-page engineering manual, No. RDP-107, including standard element specifications for selenium rectifiers and rectifier plates.

"SETTING UP A VICTOR WELDING OR CUTTING UNIT."—Victor Equipment Company, 844-54 Folsom street, San Francisco, Califa 46-page illustrated bulletin for vocational training schools and beginners. Describes in simple, understandable language how to assemble a welding or cutting outfit.

Both the 1939 A.A.R. tests and those subsequently made by A.S.F. have revealed that the two principal requirements for an easy-riding freight car are long-travel springs and proper control of spring action. The modern A.S.F. Ride-Control Truck (A-3) incorporates both of these lading-protecting features.

MINT. MARK OF OF FINE CAST

A.S.F Ride-Control TRUCK



AMERICAN STEEL FOUNDRIFS

CHICAGO

Northwest to War

No road is more prominent in transcontinental freight traffic to the great Northwest than Chicago, Milwaukee, St. Paul and Pacific. Its dependable movement of long, heavily loaded trains has been accomplished with notable operating efficiency.

Today, "Milwaukee's" giant Diesels are mainstays for the bigger job of moving still heavier war tonnage to Pacific seaports. "Milwaukee" uses Sinclair Gascon GL-HD Oil... a safe lubricant for Diesel locomotives in continuous heavy duty operation.



Sinclair's famous Gascon GL-HD, a compounded Gascon, assures clean engines. Four most important factors for the most efficient Diesel lubrication are built into Gascon GL-HD:

- 1. Its detergent qualities remove deposits from pistons and engine walls.
- 2. Its dispersion properties keep products of combustion and decomposition in suspension preventing clogged filter screens and formation of sludge.
- 3. Its anti-oxidant characteristics avoid oxidation of the oil.
- 4. Its non-foaming qualities prevent build-up of oil temperature and keep oil at its true level.

Gascon GL-HD was especially developed for lasting, dependable Diesel lubrication under continuous heavy duty operation. Its wear-prevention characteristics hold down expensive replacement and maintenance costs.

SINCLAIR REFINING COMPANY, RAILWAY SALES, NEW YORK • CHICAGO • ST. LOUIS • HOUSTON

WITH MILWAUKEE ...



SINCLAIR
RAILROAD LUBRICANTS



• Pennsylvania's Class 5-2 direct drive steam turbine locamative for passenger or freight service — wheel arrangement 6-8-6.

Pennsylvania's large fleet of new Class J-1 steam freight locomotives supplements other power in the grampt movement of war-time traffic wheel arrangement 2-10-4. Modern Coal
Burning ~

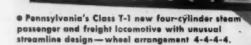
LOCOMOTIVES

Equipped with

STANDARD

STOKERS

 Pennsylvania's Class Q-2 new four-cylinder steam freight locomotive designed to Increase hauling capacity and over-all train speeds wheel arrangement 4-4-6-4.



THE STANDARD STOKER COMPANY, INC

NEW YORK

CHICAGO

ERIE

MONTREAL



You get these advantages in railroad Diesel maintenance with...

NONPAREIL HD
DIESEL OIL

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THESE advantages are doubly important to railroad Diesel operators because maintenance work must be done between runs or with the minimum lay-up of important Diesel equipment.

Two qualities of Nonpareil HD account for its advantages—unusual oxidation stability and exceptional detergency. Oxidation stability means that the oil resists deteriora-

- Greater resistance to high temperatures in railroad service
- Less crankcase deposits
 ... easier to clean
- Longer time between overhauls
- Longer filter life . . . easier to clean

tion caused by heat and thus reduces deposits formed by oxidation products. Its detergency keeps any deposit-forming products in suspension in the oil.

Therefore, there is less wear which means fewer overhauls. There are less deposits in crankcases which makes them easier to clean. There are less deposits in filters and those present are softer and easier to remove.

All this adds up to less time for maintaining your Diesel equipment. A Standard Oil Lubrication Engineer can give you all the facts about improved operation with Nonpareil HD Diesel Oil. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

Buy more War Bonds

STANDARD OIL COMPANY (INDIANA)





Inside an engine, Pedrick rings pay-off through balanced oil control

AN ENGINE NEEDS OIL to lubricate the cylinder walls. If rings are too tight, serious wear results, shortening engine life. On the other hand, nobody wants an "oil hog." When rings are too loose, carbon troubles develop, fuel costs rise.

Pedrick rings are made to give balanced oil control through an exclusive process called Heat-Shaping. Developed by Pedrick engineers, this process sets exactly the right amount of tension around the entire circumference of the ring. Cylinder walls are properly lubricated. Engine block life is extended. Fuel costs are kept down.

During the next six months, aging railway equipment must face the greatest strain of all time. By increasing operating efficiency and extending the time between overhauls for Diesels, compressors, and airbrake equipment, Pedrick rings can help you meet this emergency.

WILKENING MANUFACTURING Co., Philadelphia 42, Pa. In Canada: Wilkening Manufacturing Co. (Canada), Ltd., Toronto.

Gedrick precisioneered PISTON RINGS

WAR BONDS ARE THE MONEY YOU HAVE IN YOUR WALLET . . . PLUS INTEREST



*Install the BEARING WATCHDOG System in Your Diesels

By installing the Bearing Watchdog System in your Diesels, wear beyond predetermined standards or shell-out of connecting-rod and main bearings can be detected in plenty of time to prevent damage to the crankshaft.

The System consists of a "Watchdog", or trip-lever, installed in the crank-case under each connecting-rod throw, a lug for each connecting-rod bear-ing cap, a dump valve to be attached to the Serv-O-Motor of any standard hydraulic governor, a control box containing an air pressure reducing valve and tell-tale light, and copper tubing for connecting the various parts. The clearance between the Watchdog trip-lever and the lug on the connecting-rod bearing cap is set to represent the maximum amount of wear

The Bearing Watchdog System can be operated either pneumatically or hydraulically. Under pneumatic operation, the System is connected to the engine's main air supply and under normal conditions a constant air pressure of ten pounds is maintained. No electrical circuits enter the crankcase. If a connecting-rod bearing or main bearing wears excessively or shells out, the connecting-rod bearing cap lug strikes the Watchdog trip lever. This causes the release of the pressure from the Watchdog System which actuates the dump valve on the governor and effects an im-System which actuates the dump valve on the governor and effects an immediate engine shutdown and simultaneous lighting of the tell-tale light. Protection is also afforded if a main bearing goes out, because the crankshaft will flex sufficiently to trip the Watchdog. The engine is protected in case of broken caps, broken cap bolts or connecting-rods, because anything that releases the air pressure from the Watchdog System causes an almost instantaneous engine shutdown.

DIESEL ENGINEERING COMPANY

2614 Martha Sreet Omaha 5, Nebraska DIESEL SPECIALTIES PARTS * REPAIR SERVICE A Subsidiary of PAXTON-MITCHELL COMPANY

Manufacturers of P-M Metallic Rod Packing

- PROTECTS THE CRANKSHAFT.
- PERMITS MAXIMUM BEARING WEAR.
- MAKES FREQUENT BEARING INSPECTION UNNECESSARY.
- LOCATES FAULTY BEARING INSTANTLY.
- CAN BE EITHER HYDRAULICALLY OR PNEUMATICALLY OPERATED.
- IS SIMPLE . . . POSITIVE . . . HAS LOW MAINTENANCE FACTOR.
- PROTECTS THE ENGINE.

The Bearing Watchdog System has been thoroughly tested and approved by Diesel Owners and Operators. It affords inexpensive insurance against expensive crankshaft repairs and replacements.



Install the

... IN YOUR DIESELS

We invite inquiries from Diesel Owners and Operators, Diesel Designing Engineers and Diesel Manufacturers. Write today!

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f every raceway for a Hyatt Roller Bearing were painstakingly fashioned by expert tool makers they could be no more concentric or of more uniform wall thickness than obtained by our centerless grinding machine production.

First we externally grind by our improved arborless grinding method. Then the perfect outside periphery thus obtained is used as a guide in grinding the inner diameter of outer races, the track upon which the rollers operate.

This new principle invented several years

ago by Hyatt Methods and Equipment Engineers we call "Chuckless Grinding." Thus into the machine we built the skill of the craftsman and precision manufacture at a mass production pace was born.

This is just another example of the many exclusive manufacturing processes which enable us to build accuracy, longer life and more dependable performance into Hyatt Roller Bearings for every application.

Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS



Wherever your yards and right of way lie within city limits and close to residential or business districts, quiet operation is a vitally important factor in your public relations.

Maxim Silencers make it possible for you to use powerful Diesels in switching and main line locomotives — so quietly that engine exhaust can hardly be heard above the rumble of the wheels.

Illustrated above is the Maxim Exhaust Manifold Silencer, which replaces the conventional exhaust manifold. It provides the advantage of space saving while effectively silencing Diesel exhaust noise.

Standard Maxim Silencers are also serving the country's railroads; often — in fire hazard areas such as refineries, ordnance plants and the like — equipped with the Maxim Spark Arrestor.

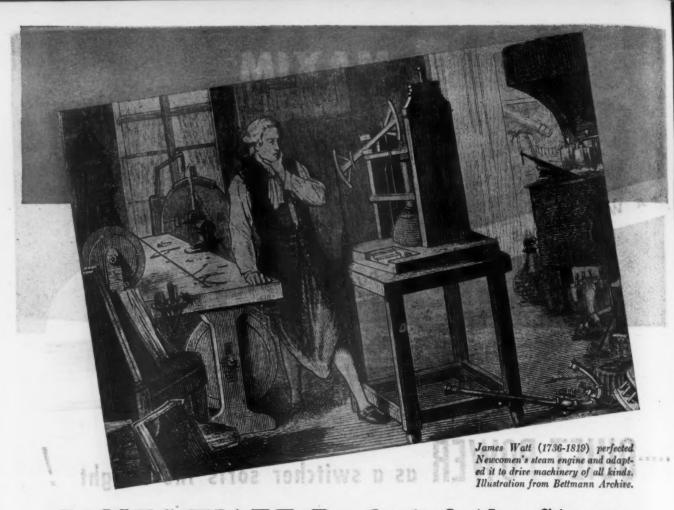
New possibilities in railroad operation are opened by Maxim Heat Recovery Silencers, which combine effective silencing with production of steam or hot water for heating. The spark arrestor feature may also be included if required.

Heat Recovery Silencer Bulletin WH-101 contains information of interest to the forward-looking railroad executive. May we send you a copy?



MAXIM

THE MAXIM SILENCER CO. . 65 HOMESTEAD AVE., HARTFORD, CONN.



JAMES WATT Perfected the Steam



CHEVRON PACKING is one of the many Garlock quality-controlled packings. The unique hinge-like design allows the packing to expand and contract—it adjusts itself automatically to variations in pressure.

THE GARLOCK PACKING COMPANY PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada, Ltd., Montreal, Que.

Engine in 1781

"One Sunday morning" wrote James Watt, "the idea occurred to me that steam would expand and rush into a vacuum." At that moment the modern steam engine was born in Watt's brain—a flash of genius for which all mankind is thankful.

About the time steam engines came into general use nearly a century later, Garlock began manufacturing



packings to improve their operation and today Garlock supplies packings and gaskets for millions of engines now in use throughout the world.

Garlock

HOW APEXIOR SURFACING CUTS LOCOMOTIVE SHOP TIME

Easier Cleaning . . . More Effective Washing . . . Longer Service from Boiler Metal

A protective coating of APEXIOR NUMBER 1, a few thousandths of an inch thick, over the water side of locomotive boiler shells and other surfaces exposed to boiler water and steam makes a big saving at shopping time.

APEXIOR retards formation of scale and prevents any chemical bonding with the metal. What scale does adhere comes away easily. Furthermore, an APEXIORIZED surface remains smooth; boiler deposits have little to cling to, and flush away easily.

By preventing water-or-steam contact with metal, APEXIOR NUMBER 1 effectively retards or checks corrosion and pitting in locomotive boilers. Coating water contact areas subject to embrittlement or accelerated stress corrosion has proved effective in minimizing these hazards. The APEXIOR NUMBER 1 coating needs no attention between shoppings.

APEXIOR NUMBER 1 is applied in thousands of locomotive boilers subject to Interstate Commerce Commission inspection.

Supplements Feedwater Treatment

APEXIOR NUMBER 1 is brush-applied and therefore is not a substitute for feedwater preparation or chemical treatment. It is inert to all the chemicals generally used and supplies protection for metal in service under boiler water and steam temperatures and pressures, supplementing the work of the chemist and water service engineer by increasing the durability and raising the service quality of the boiler metal.

APEXIOR NUMBER 3

This brush-applied, durable coating protects the water space of locomotive tenders. It air-dries to a chemically inert, shiny-black film, resistant to water or moisture and chemicals used in water conditioning. It does not affect Interior of Locomotive Boiler Shell after 3½ years of operation without cleaning. This shell had been sand blasted and surfaced with APEXIOR NUMBER 1.



potability of water. Picture shows interior of tender cistern 21 months after surface at right was coated with APEXIOR NUMBER 3. Corroded surface at left was not coated, for comparative test.

See Locomotive Cyclopoedia. And write for Bulletin;

THE DAMPNEY COMPANY OF AMERICA
Hyde Park, Boston 36, Mass.

Please send free Bulletin.

Name

Company

Old Metal Given
New Metal Kept New
For Years

Old Metal Given
New Life



CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.



MOLYBDIC OXIDE, BRIQUETTED OR CANNED.
FERROMOLYBDENUM."CALCIUM MOLYBDATE"

Clima Division on Company



HONEYWELL SHUTTER CONTROL SYSTEM

After 7est On Diesel Electric Switcher!

hen positive shutter control on a switch engine is needed most, the crew usually has little time to make manual adjustments. Yet cooling water temperature must be held constant if the engine is to operate at peak efficiency. Recognizing these facts, the Great Northern Railway conducted a test installation with the Honeywell Shutter Control System in the Diesel electric switcher shown above. Performance under operating conditions demonstrated clearly the advantages of this automatic Shutter Control System. Engine cooling water is held at the re-

quired degree, continuously, although requirements on a switcher are more severe because of extreme load variations. With this contribution to top running efficiency, the Honeywell Shutter Control System helps hold operating and maintenance costs at a minimum. Today, this control system is proving its value in additional Great Northern Diesel locomotives and others in all parts of the country. For detailed information write Minneapolis-Honeywell Regulator Co., 433 East Erie Street, Chicago 11, Ill. Branches and distributing offices in all principal cities.





... as if THAT was

all that mattered!

was doing different fishing last week . . . for a metal.

"Hauled in plenty of suggestions, too. Only none of 'em would fit my job.

"Most of 'em had only half to properties I needed. Some had only one. Like Jim's—all his metal could offer was corrosion resistance.

"But what good's corrosion resistance if the metal can't stand the load? And, what good is strength if the metal corrodes away before next summer?

"Sure. I needed corrosion resistance. But this job also called for a metal that was non-magnetic and strong...tough.,,hard as a heat-treated alloy steel.

"And, just to make the prob-

lem a little more difficult . . . the metal had to be readily machinable.

"Then . . . someone suggested the INCO Nickel Alloys.

"That was the tip I needed!

"All of them had Jim's corrosion resistance, plus strength, toughness, hardness and machinability. And each one also had certain specialized properties.

"Knowing the properties I needed, it was easy to run down the list and choose the INCO Nickel Alloy that had exactly the combination of properties needed—heat-treatable 'KR' Mone!

"It worked as though it'd been made especially for my job!"

A multi-ton unit...or a pin-like fastening. Size imposes no limitations when you use INCO Nickel Alloys to build in the "performance" you plan.

Investigate these alloys whenever you need tough metals for tough jobs. Each offers a different (and hard-to-find) combination of properties.

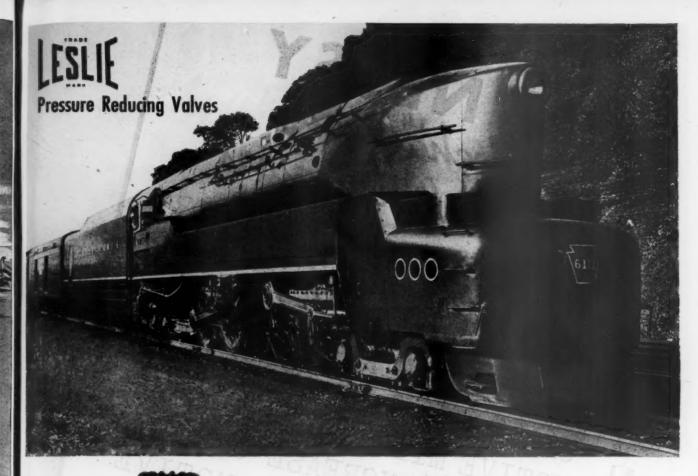
Tell us the alloy that interests you, and we'll mail more information. Or, send for "List B-100," listing over 100 bulletins which explain the properties and applications of the INCO Nickel Alloys. The International Nickel Company, Inc., 67 Wall St., New York 5, N.Y.

NICKEL



MONEL* • "K" MONEL* • "S" MONEL* • "R" MONEL*
"KR" MONEL* • INCONEL* • "Z" NICKEL* • NICKEL
Shoot...Strip...Red...Tulting...Wire...Castings...Wolding Reds (Res & Electric)

CORROSION HIGH HIGH HIGH HIGH HIGH HIGH HIGH HIGH HIGH STRENGTH HIGH HIGH GOOD HIGH GOOD HIGH HIGH -TOUGHNESS HIGH GOOD FAIR HARDNESS GOOD GOOD GOOD HIGH H!GH GOOD GOOD HIGH 6000 MACHINABILITY HIGH NO NO NO NO NO NO HIGH NO NON-GALLING SPRING PROPERTIE HIGH HIGH NO GOOD HIGH COOL NO POOR POOR POOR POOR POOR POOR GOOD HEAT HIGH COOD HIGH 6000 0000 0000 HEAT NO NO NO YES YES YES NO YES NO NO YES YES YES NO



On Modern Power —

THE Pennsylvania class T1 locomotives have proved to be so powerful that they are suitable for freight and for heavy passenger trains that would otherwise require double-heading.

These locomotives and 50 more that are now on order are, in one respect, similar to a large percentage of American Passenger Locomotives — they are equipped with LESLIE Pressure Reducing Valves — for Steam Heat Service.

LESLIE Reducing Valves are also used for many other railroad applications — in power houses — back shops, large terminals — on air, steam and gas lines. Their economical and efficient performance is recognized by Mechanical Department officers.

Complete information pertaining to the design, capacity and installation details of all LESLIE Reducing Valves, Pressure Controllers, Temperature Regulators, Pump Governors and LESLIE-TYFON Whistles will be forwarded immediately upon request. Write today for catalog of engineering data #400.

LESLIE CO. . LYNDHURST, N. J.

ESTABLISHED 1900

HENNESSY Mechanical Journal Lubricators BY DELAYING SHOPPING FOR RUNNING GEAR REPAIRS IN-DEFINITELY, THUS MAKING POSSIBLE A TREMENDOUS IN-CREASE IN CONTINUOUS LOCO-MOTIVE MILEAGE, ARE DOING MORE TO INCREASE OVERALL AVAILABILITY OF MOTIVE POWER THAN ANY OTHER RECENT STEAM LOCOMOTIVE EVELOPMENT HENNESSEY LUBRICATOR CO., New York 6, N. Y. 75 West Street See Railway Age for July 28th for details of a remarkable Hennessey erformance record on the B&O

FOR GREATER STRENGTH without more weight



When used for locomotive side rods such as this, Republic Alloy Steels insure highest strength for the weight involved—and provide uniform bardenability that produces wear-resistant surfaces.

-no other material can equal ALLOY STEELS

When power and speed of locomotives are stepped up—and operating parts such as side rods, pins and bolts must be made stronger without increase in size or weight—it's a job for Republic Alloy Steels.

Alloy steels are the strongest of metals. Their exceptionally high strength-to-weight ratio assures the most efficient combination of these two properties.

But there are other good reasons for your use of alloy steels. They can be hardened uniformly and accurately to the greatest extremes of any material—hence are highly resistant to abrasion. They insure against non-hardened or soft spots in wearing surfaces.

Alloy steels also provide super-toughness to resist sudden shock, strain or reversal of stress. They resist fatigue, high temperatures, sub-zero cold and corrosion. They are the most dependable and the hardest working steels that money can buy.

Republic's wide experience as the world leader in the production of alloy steels is yours—to help you increase efficiency of equipment, to keep it out of the repair shop longer and to cut costs. Write us.

REPUBLIC STEEL CORPORATION

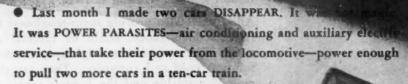
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.



Also Carbon and Stainless Steels—Sheets—

AND NOW ...

here's the way to
ADD TWO CARS
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ADDING TWO REVENUE PRODUCING CARS is no trick other simply KILL the POWER PARASITES by installing the WAUKESHA TWINS—the Ice-Engine and Engine-Generator—for these services. Quiet, independent, self-contained, automatic, air conditioning and electric energy for every car. Its power source is propane, the ideal engine fuel—economical, efficient, reliable, safe.

No parasite power drag! No terminal stand-by problem! Entirely independent of train movement, car location or the locomotive.

Modern deluxe air conditioning and lighting for every car on demand—automatically—by the Waukesha independent engine-driven units. Ask any of the 25 major railway users.

Refrigeration Division

WAUKESHA MOTOR COMPANY

WAUKESHA . WISCONSIN

Largest Builders of Mobile Engine-Drivon Refrigeration and Generator Equipment



A Dayton railway specialist will gladly show you how your most exacting power drive problems—for air conditioning, lighting, ventilation—can be solved with V-Belts made by Dayton, the World's Largest Manufacturer of V-Belts.

THE DAYTON RUBBER MANUFACTURING COMPANY
DAYTON 1, OHIO

40 years experience in both natural and synthetic rubber processing

Dayton

Rubber

dual service...with a single purpose

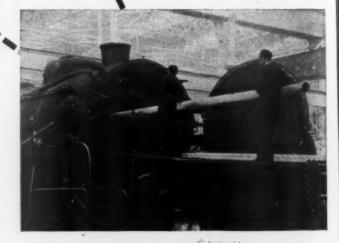
B&W Welded Tubing is made by the Electric-Resistance welding process.

Piercing Seamless Tubing in one of the B&W specialty tube mills.

Finding the right kind of tubing for steam locomotives or stationary boilers of any design is greatly simplified when the problem is put up to Babcock & Wilcox. Matching tubes to jobs—applying the kind that will stand up best in any combination of operating conditions or type of equipment is a specialty at B&W.

Here your requirements are considered in the light of over 40 years' experience gained from making more than 700 million lineal feet of pressure tubing—both seamless and welded—for all types of steam generating and heat transfer equipment. The time-saving, cost-cutting advantages of using B&W tubes are being secured in boilers and other applications of pressures up to 3500 lb. and temperatures as high as 1500 F. Because of its dual-tube-producing facilities, B&W matches tubes to your equipment without prejudice toward any type or materials. You can therefore depend on B&W recommendations being both authoritative and unbiased, and aimed at this single objective: supplying you with the best tubing for each specified job.





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ELECTRIC-Resistance Welded Corbon prodes Sizes: 3/4 in. to 4 in. O.D.

THE BABCOCK & WILCOX TUBE COMPANY

Seamless Tube Division BEAVER FALLS, PA. Welded Tube Divisies ALLIANCE, OHIO

TA-1310B

ME AND TEN MILLION BUDDIES GOTTA BE ROLLIN' WEST

We have finished with the war on one front and want to get through with the war against the Nips as soon as we can. A lot of us will be going home for a few days and then rollin' West. Please help us make the most of our furloughs before we head for the Pacific by keeping your railroad travel to a minimum and only for essential business. Me and my ten million buddies will thank you.





RELIANCE LOCOMOTIVE HY-CROME SPRING WASHERS

Locomotive Hy-Crome Spring Washers are still doing their bit in keeping locomotive and rolling stock, bolted assembled parts tight and under constant tension by automatically compensating for inevitable looseness. Thus they are keeping shopping hours to a minimum and keeping hard, war used rolling stock and locomotives in service longer.

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Reliance Division

Sales Offices: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

Hydraulic Muscles

Like a muscle which instinctively tightens against resistance, a Houdaille* Shock Absorber "fights back" harder and harder as forces mount in magnitude.

That's why the Houdaille hydraulic principle has proved so effective during the past ten years on America's most famous streamliners. Improved Houdaille instruments for vertical and lateral control are now available.

HOUDE ENGINEERING DIVISION OF

HOUDAILLE-HERSHEY CORPORATION

MAKERS OF HYDRAULIC CONTROLS BUFFALO 11, NEW YORK

*Pronounced-Hoo-dye

EXIDE POWER ASSURES STEADY, DAYLONG SERVICE

The exception of fine performance of electric industric trucks reaches its peak when the motival power is Exide. Lifting, hauling and stacking of unit loads progress steadily all day long, speeding up production, cutting handling costs, and enabling limited manpower to schieve full crew results.

for this important job because they have the

strain. Their ample reserves as the watered speeds throughout such about and task rugged construction keeps them on the job. You can always count on I side Batteries for dependability, long-life and the committee the

Write us for a FRFE copy of the balletin "Unit Loads," prepared by The Electric Industrial Track Association. It tells bow to our handling costs up to 50% according developments in materials handling ... and includes accual case histories.

THE FLECTRIC STORAGE BATTERY COMPANY, Philadelphia 32

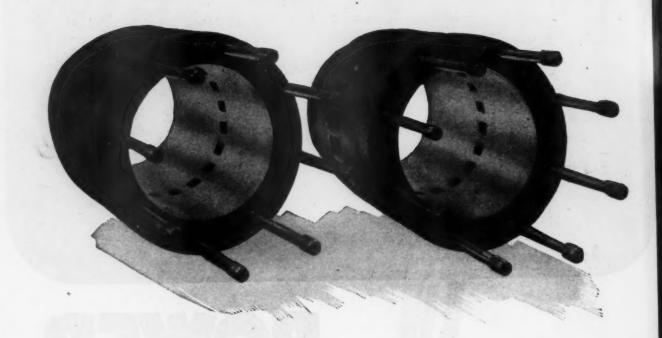


POWER





LINER WEAR.OOI IN after 157,076 miles!



Gruelling Rock Island Test Proves RPM DELO Oil Reduces Wear

With RPM DELO Diesel Engine Lubricating Oil in one of its "Rocket" Diesels, oil changes were eliminated, make-up oil added as required. Careful inspection at the end of 157,076 miles showed liners bright and clean and with only approximately one-third expected normal wear. Special inhibiting, detergent and peptizing properties of RPM DELO Oil also brought lowered oil consumption and cost, complete absence of hard or abrasive carbon formations, kept rings free, ports unclogged, entire engine assembly cleaner.

RPM DELO Oil will give you greater engine availability. Get full information from your RPM DELO Oil distributor, or write for details.



Write on your letterhead for free booklet on RPM DELO Oil to Standard of California, Dept. R-1, 225 Bush St., San Francisco 20, Calif., or California Commercial Co., 30 Rockefeller Plaza, New York 20, N. Y.

RPM DELO Oil has world-wide distribution under the names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Imperial RPM DELO

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...and STRENGTH

Superior Cas Doors have the strength of girder construction, plus a saving of approximately 22% in weight.

They are in barmony with today's trend to lightweight construction and reduction of dead weight.

SUPERIOR CAR DOOR CO.

McCormick Building, Chleage

SUPERIOR CAR DOORS

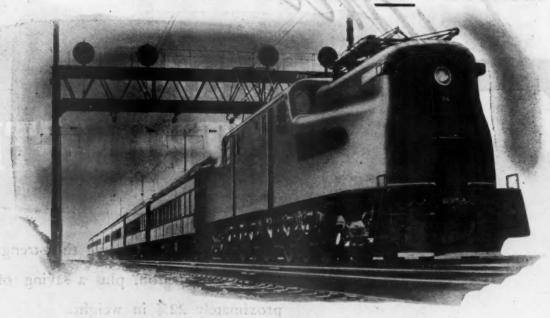
- RIGID CONSTRUCTION
 - LIGHT WEIGHT
 - LONG LIFE
- WEATHER PROOF
 - FREE ROLLING
 - NO SLAMMING

SUPERIOR CAR DOORS ARE lightweight doors

OVER 50 YEARS OF PROOF ... THAT

SERVICE

FOR THE BIG POSTWAR JOB





Under specific kinds of operating conditions, Electrification provides improved train operations through: faster schedules . . . smoother handling . . . greater reliability and flexibility ... increased train tonnage and track capacity.

Reduced operation cost through: lower maintenance cost for motive power and rolling stock . . . less locomotive terminal time and expense . . . elimination of large coal and water facilities . . . more efficient use of coal to produce electric power.

Preferred by Shippers



Where traffic is congested, where grades are exceedingly heavy, where hauls must be made in record time, Electrification provides faster scheduling, more expeditious point-to-point handling, for the shipper-at a lower operating and maintenance cost for

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your railroad. Electrification also presents an excellent opportunity for railroads to capitalize on their greater independence of weather, as well as their more central shipping and receiving facilities.

A FEW OF THE RAILROADS USING Electrification TO BEAT THE COMPETITION

THE BALTIMORE AND ANNAPOLIS RAILROAD COMPANY









Westinghouse FOR OVER SIXTY YEARS THE

WITH Electrified Operation -TO ASSURE POSTWAR PROFITS

CONSULT WESTINGHOUSE ON ELECTRIFICATION BENEFITS FOR YOUR RAILROAD

In 1893, when the Empire State Express "999" made the first recorded run at a speed of more than 100 miles per hour, Westinghouse made its first electric locomotive.

Since then, Westinghouse has been working with many railroads on both inauguration and extension of Electrification where it pays the biggest dividends... whether from competitive, operating efficiency or lower cost and maintenance standpoints. Electrified Operation became "Preferred Service"—preferred by passengers... shippers... and management.

Westinghouse engineers are ready to discuss where and how "Preferred Service" will assure Postwar Profits for your railroad. Call your Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

Preferred by Passengers



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Faster scheduling . . . smoother rides, smoother stops and starts . . . greater reliability . . . cleaner operation and interiors . . . these are but a few of the reasons why Electrified Operation is preferred by passengers.

Many "war-born" or "postwarplanned" communities now de-

pendent on slower, less comfortable or less dependable modes of transportation will welcome cleaner and quieter Electrified Operation. These communities represent an additional source of postwar traffic freight and passenger revenue.



OF THE SKYWAYS OF THE HIGHWAYS THE WATERWAYS



Railroad Electrical Equipment

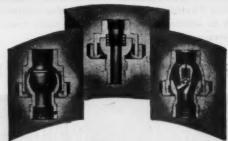


Feed lines which carry the essential fluids of industry need constant protection against those "traffic interrupters"—vibration and shock. Barco Flexible Joints provide such protection by compensating for contraction and expansion with responsive movement in every direction. For over 30 years they have been the accepted standard in every field of both industry and transportation. Barco Manufacturing Co., Not Inc., 1808 Winnemac Ave., Chicago 40, Illinois.

In Canada: The Holden Co., Ltd., Montreal, Canada

BARCO

FREE ENTERPRISE - THE CORNERSTONE OF AMERICAN PROSPERITY



FLEXIBLE JOINTS

COSPERITY

"MOVE IN EVE



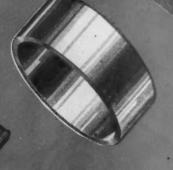
Not just a switel joint ... but a combination of a switel and ball joint with rotary motion and responsive movement through every angle.

DIRECTION"















Labor and time-out-of-service cost for replacing pins, bushings and wear plates, so dwarfs the actual cost of these parts that the best is never too good. Replace with Rol-man and they are "in place" for many years.

If you specify Rol-man for new cars or locomotives, you're going the limit to keep them out of the shop, for a long, long time.

Manganese Steel Forge Co., 2813 Castor Ave., Philadelphia 34, Pa.

Rol-man has been serving leading railroads for over 20 years.

PINS BUSHINGS WEAR PLATES

Rol-Man Pins and Bushings are ground to precision diameters. Wear Plates are fabricated to your specifications, ready for installation.

For Better-Safer Freight Car Operation



BARBER "Monocast" Side Bearings improve the riding qualities of freight cars by minimizing car body roll, side bearing friction, rail wear, and wheel flange wear.

The housing is cast integral with the bolster without extra cost. The "Monocast" rollers and wear plates are made of tough, drop-forged, heat-treated steel. Proper adjustment either upward or downward requires only a slight jacking-up of the car body.

Better, safer, economical freight service is possible by specifying Barber "Monocast" Side Bearings for your equipment.

ave Philadelphia 24 Pa

STANDARD CAR TRUCK COMPANY
332 SOUTH MICHIGAN AVENUE CHICAGO 4, ILLINOIS

112

RAILWAY MECHANICAL ENGINEER

Tomorrow's POHER

OBJECTIONS TO ADMISSION OF EXHAUST STEAM FROM AUXILIARIES INTO FEED WATER HEATERS



IT'S THE

COMPANY

OPPOSED - PISTON

Street

DIESEL LOCOMOTIVE BY

FAIRBANKS-MORSE

A name worth remembering

COMPANY

ANTHUES

FEEDWAIER HEATING By Co.////

OBJECTIONS TO ADMISSION OF EXHAUST STEAM FROM AUXILIARIES INTO FEED WATER HEATERS

- 1 It substantially increases the live steam consumption of all auxiliaries exhausting into the heater on account of having to operate against heater back pressure.
- 2 It materially decreases the capacity of auxiliaries as compared to their capacity with atmospheric exhaust.
- 3 It greatly increases the problem of oil removal as all the lubricating oil from the auxiliaries is introduced into the heater and must be either removed or discharged into the boiler.
- 4 It needlessly substitutes this dirty, oil laden exhaust steam for the comparatively clean exhaust steam from the cylinders.

For Further Details Mail The Coupon Below.

THE J. S. COFFIN, JR., COMPANY 326 South Dean Street Englewood, New Jersey

PLEASE SEND FEED WATER HEATER BULLETIN
NAME_
COMPANY_______
ADDRESS_______

Colon FREIGHT CARS

Now, Monroe's new Direct-Acting Hydraulic Shock Absorber unit is accepted as an outstanding engineering development for America's freight car rehabilitation program.

Incorporating the same exclusive Monroe Airplane Type *Hydraulic* Shock Absorber principles that have proved their superiority over millions of railway car miles . . . it is a proved product.*

GREATER SAFETY...LOWER COSTS

Monroe's Direct-Acting Hydraulic Shock Absorber unit checks progressive harmonic motion . . . controls vertical and swaying action . . . protects lading, equipment and roadbed . . . reduces maintenance costs and damage claims . . . makes higher speeds safer and practicable.

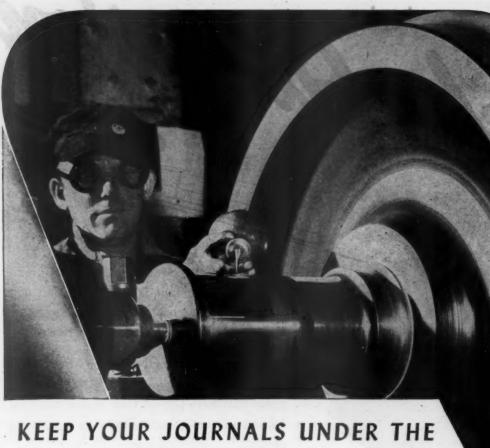
It is quickly and easily installed... fits right in . . . replacing one of the coil springs or snubbers in the spring cluster.

In use since 1938 on high speed crack streamliners, Monroe Airplane Type Hydraulic Shock Absorbers have smoothed the ride and saved thousands of man hours' maintenance time. They demonstrate the soundness of exclusive Monroe Hydraulic Shock Absorber principles.

Our engineers will gladly work with you in the application of this modern new Monroe Direct-Acting Hydraulic Shock Absorber for the rehabilitation of your freight cars.

RAILWAY SUPPLY DIVISION

EMONOR AUTO ROLLEMENT CO. LEAVES TO SE



CARS. Not On Your Lathes

n these days of over-age and over-loaded cars, journal protection has become a science.

We are thoroughly familiar with it. During seventy-one years of metallurgical and engineering progress-hand in hand with leading railroads - we have amassed a wealth of experience in perfecting bearings that help prevent scoring and excessive wear on journals.

> Give your journals longer life - reduce their reconditioning trips to your lathes-with dependable, easy-running

N.B.M JOURNAL BEARINGS AND ENGINE CASTINGS



L BEARING ATIONA



PLANTS IN: ST. LOUIS, MO. . PITTSBURGH, PA. . MEADVILLE, PA. . JERSEY CITY, N. J. . PORTSMOUTH, VA. . ST. PAUL, MINN. . CHICAGO. ILL.



YOU CAN - count on New Air **Conditioning Equipment That Saves** wear and maintenance!

FOR EXAMPLE—the new Sturtevant Compressor-Condenser Unit is designed so that wear and tear due to frequent starting and stopping is minimized. The compressor operates continuously instead of cycling 10 or 12 times an hour — as with most existing systems. And variable output, the result of cutting in, and cutting out individual cylinders in conjunction with a divided evaporator, means more uniform temperature and humidity conditions in your car.

Valves, gauges, and all parts of this new Sturtevant Compressor-Condenser have traordinary skill or special tools are needed.

MANY OTHER IMPROVEMENTS

Typical of the new Sturtevant Equipment that can be combined in a mechanical system are the Compressor-Condenser Unit, the Divided Evaporator, the Dry Surface Condenser, the Motor Compressor Unit and the Evaporative Condenser that uses spray water. So whether you are only interested in pressure ventilation or a complete air conditioning system — either ice activated or mechanical—it will pay you to see Sturtevant now. Talk with a Sturtevant Engineer and learn how this new Sturtevant Railroad Equipment can help boost profits and cut operating costs.

B. F. STURTEVANT COMPANY

HYDE PARK

BOSTON 36, MASS.

Branch Offices in Principal Cities

STURTEVANT GIVES YOU ALL 4 RAILROADING ADVANTAGES

- More uniform temperature and humidity conditions in the car.
- **Z** Equipment designed for easy maintenance.
- 3 Equipment designed for minimum space and weight.
- 4 Equipment that requires a minimum power load.

Sturlevant Pete Six to Work

STURTEVANT "Railvane" Units or Systems are used by 40 railroads and are covered by more than 80 issued patents and patents pending

SALES

ILL. NEER **Experience says:**

ten years of mole

"free service

with

PRESSURE

Here's a stock car that's not going to show up in the shop for deck repairs due to decay for a long, long time. Why? Because nailing strips and decking are pressurecreosoted wood!

Pressure-creosote treatment has proven itself the greatest life-extender for stock car decking that has ever been developed. A midwestern railroad recently reported on experience with 200 stock cars with pressure-creosoted decking. During the first 14 years of service, no creosoted wood was removed because of failure from decay.

After 18 years, when the cars were repaired, only a very few pieces of treated wood required removal, and probable average life was estimated as in excess of 20 years. In the 18-year period, untreated roofing slats and posts in a number of the cars had been replaced as many as three times.

The use of pressure-creosoted

wood for stock car decking is steadily increasing, as more and more railroads discover its profit possibilities. You'll find that the cost of treatment is written off in a short time, and after that pressure-creosoted decking gives you "free service" for the rest of its long career. We will be glad to quote you on your requirements.

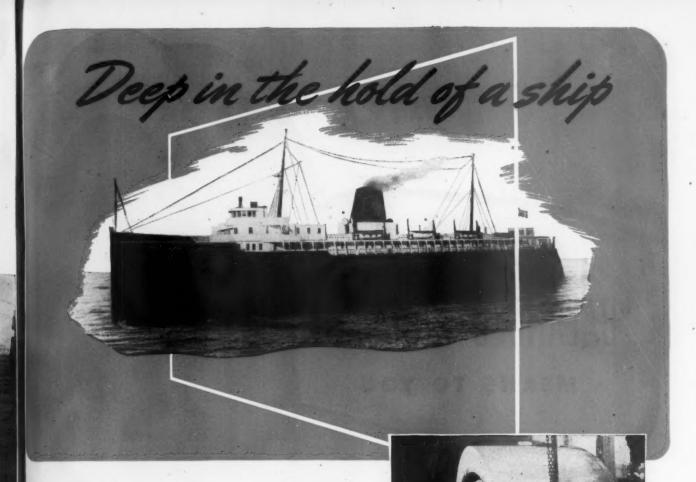
KOPPERS COMPANY, INC.—WOOD PRESERVING DIVISION

PITTSBURGH 19, PA.

KOPPERS

Buy War Bonds and Keep Them!





NATIONAL ELECTRIC FIELD CREW REPAIRS MOTOR "ON THE JOB"

Full National dependability is available to you even though it is impossible to send your ailing rotating electrical machine to one of our service shops. The two propeller motors of the boat shown were set in place before it was completed; they cannot be removed without dismantling the boat. A National field crew rewound both stators "deep in the hold of the ship." Our plants kept a steady flow of National coils reaching them as they were needed. Only 11 days per motor were required. Incidentally, several improvements in mechanical details of the motors were made as the work progressed. This combination of thoroughly competent field crews and National plant facilities puts National quality in the palm of your hand, wherever you may be. If your rotating electrical machines are in need of repair or re-design, call for a National field engineer. He'll work out a practical solution, regardless of where the work must be done.



WORKING BELOW THE WATER LINE

The photo above shows a National field crew member working below the water line on a drive-shaft motor of a huge car ferry. The ferry is a twin-screw ship, each screw, with its power source, being entirely independent of the other. For each propeller, a high-pressure steam turbine drives a turboalternator which supplies the power for the motor. Each motor is rated at 3,600-hp, 2,300-V, 120-rpm. The rotors are mounted directly on the propeller shafts.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16,

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—



OHIO, U. S. A.
REDESIGNING AND REPAIRING OF
ROTATING ELECTRICAL MACHINES



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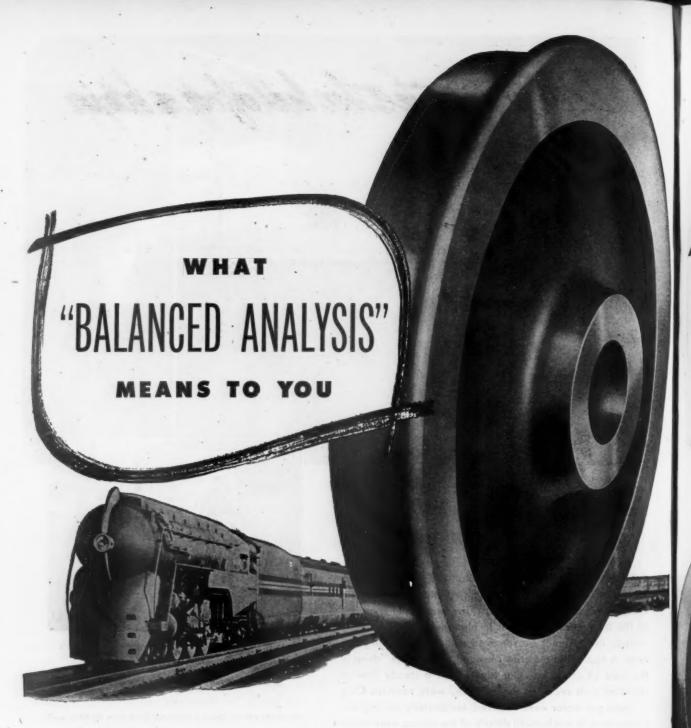
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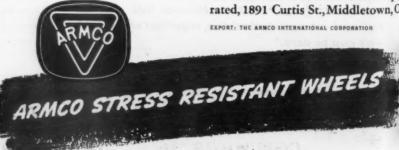


"Balanced analysis" is more than a slogan for ARMCO Stress Resistant Wheels. It's an exclusive process that gives wheels the highest resistance to shelling for a given resistance to thermal cracking.

This means greater safety and more profitable wheel miles for the vital years ahead. It's the big reason why 32 of the country's leading roads have ARMCO S-R Wheels in service.

These railworthy wheels not only start rolling with low internal stress,

but they strongly resist stresses built up in service. Your rolling stock keeps on the move in wartime traffic, Ask us for all the facts on ARMCO Stress Resistant Wheels. Just call our nearest district office, or write direct to Armco Railroad Sales Co. Incorporated, 1891 Curtis St., Middletown, O.



"THE WHEEL OF TOMORROW IS ROLLING TODAY

21,000

Let the RECON Spe O IPES CONTRACTOR OF THE PARTY OF THE PARTY

DRIVI



on the second of the world is convincing. Among their outstanding advantages are the following:

Greater Strength — Less Weight —
Insurance Against Out-of-Round
Wheels — Increased Tire Mileage —
Less Maintenance Expense

GENERAL STEEL CASTINGS

Eddystone, Pa.

Granite City, III.



- * ALL STEEL CONSTRUCTION
- * MICA INSULATION
- * RUGGED TERMINALS
- * PROVISION FOR EXPANSION
- * ADEQUATE VENTILATION
- * UNAFFECTED BY VIBRATION
- * MOISTURE RESISTANT
- * CORROSION PROTECTED

Steel and Mica, with P-G exclusive design, are used to create a resistor capable of protecting vital equipment, especially, where service requirements are severe. Adjustments to suit actual operating conditions can be made quickly by use of extra terminal connections usually available. Try P-G Resistors for constant "Trouble Free" performance.

BULLETIN No. 500 . . .

Gives detailed information . . . Copy on request.



The Nonfreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

· ESTABLISHED 1892 .

221 WEST THIRD STREET, CINCINNATI 2, OHIO



of thermal stability well beyond previous limits

Dow Corning, pioneer in silicone product development, brings outstanding new efficiency to the mechanical equipment of American industry. In the enlarging family of IC materials are Fluids, Greases, Compounds, Insulating Varnishes and Silastic*, the new Dow Corning Silicone Rubber—products that extend the range of service temperatures well beyond the thermal stability of conventional organic materials. **TRADE MARKE, DOW CORPORATION



silastic-coated resistors
operate successfully at
275° C. . . . quality under
Grade 1, Class 1 specifications by taking the plunge
from 275° C. into ice water
nine successive times. Silastic
is available in coating, extruding and molding stocks.



DC STOPCOCK GREASE, MIGH VACUUM TYPE, effectively scals and still prevents freezing of stopcocks and other ground glass joints under high vacuum. This new high vacuum silicone grease is recommended for use over a temperature range of -40° F. to 450° F.



will not support combustion! Pictured are DC 993 varnished Fiberglas and mica insulated stator coils seven seconds after five-minute exposure to direct flame of a gasoline blow torch. As a result of this non-combustibility fire hazard is reduced.



DC 4 IGNITION STALING COM-POUND is an ideal lubricant and seal for radio-shielded terminals and disconnect junctions. It excludes moisture, protects organic insulations, and neither hardens nor melts in the temperature range - 40° F. to 400° F.

FOOTNOTE ON THE INDUSTRIAL FUTURE:

Dow Corning Silicone products are available in commercial quantities. Inquiries on your own specific applications are invited.

DOW CORNING CORPORATION MIDLAND, MICHIGAN



FIRST IN SILICONES



TROUBLE CHASER!

Even though carefully hand driven, and then smoothed up, slotted screws spelled trouble for this well-known typist's chair manufacturer. Some burrs got by inspectors, snagged steno's stockings.



OUTPUT PACER!

But burrs became a memory when he switched to Phillips Recessed Head Screws. Better still, workers, freed of the dangers of finish-scarring driver skids, boosted output plenty with fast power-driving.



FUTURE FACER!

Because they are engineered to take top driving pressures, Phillips Screws help designers improve product strength and rigidity. With stronger, tighter fastenings, any product is in better shape to meet coming competition.



ORDER PLACER!

At the point-of-sale, the Phillips Recess' eye-appeal will help to get the order. Burr-free, blending with any product's beauty – it's the finishing touch that softens the toughest prospects!





In the Phillips Recess, mechanical principles are so correctly applied that every angle, plane, and dimension contributes fully to screw-driving efficiency.

- ... It's the exact pitch of the angles that eliminates driver skids.'
- ... It's the engineered design of the 16 planes that makes it easy to apply full turning power without reaming.
- ... It's the "just-right" depth of recess that enables Phillips Screw Heads to take heaviest driving pressures.

With such precise engineering, is it any wonder that Phillips Screws speed driving as much as 50% - cut costs correspondingly?

To give workers a chance to do their best, give them faster, easier-driving Phillips Recessed Head Screws. Plan Phillips Screws into your product now.

PHILLIPS Recessed SCREWS

WOOD SCREWS . MACHINE SCREWS . SELF-TAPPING SCREWS . STOVE BOLTS

Made in all sizes, types and head styles • •

25 NRCES

124

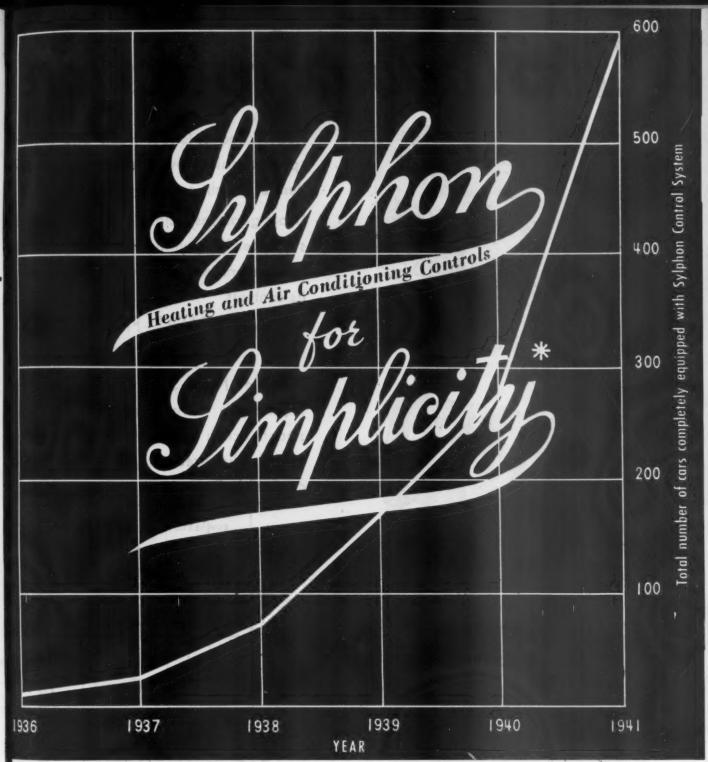
American Serew Ca., Providence, R. I.
Atlantic Screw Works, Hartford, Coen.
The Bristol Co., Waterbury, Coen.
Central Serew Ca., Chicago, III.
Chandler Products Corp., Cleveland, Ohio
Continental Serew Co., New Bedford, Max
The Corbin Serew Corp., Rew Britain, Conn.
General Serew Mfg. Co., Chicago, III.

The H. M. Harper Co., Chicage, III.
International Serew Co., Detroit, Mich.
The Lamen & Sessions Co., Cieveland, Ohie
Manufacturers Serew Products, Chicage, III.
Milford Rivet and Mashine Co., Milford, Cann.
The National Serew & Mfg. Co., Cieveland, Ohie
New England Serew Co., Keene, N. H.
Parker-Kalen Corp., New York, N. Y.
Pawtucket Serew Co., Pawtucket, R. I.

Pheell Manufacturing Co., Chicago, III.
Reading Screw Co., Norristown, Pa.
Russell Burdsall & Ward Belt & Nut Co., Part Chester, N.Y.
Seovill Manufacturing Co., Waterville, Con.,
Shakeproof Inc., Chicago, III.
The Southington Hardware Mfg. Co., Southington, Cons.
The Steel Company of Canada Ltd., Hamilton, Canada
Wolverine Belt Co., Detroit, Mich.

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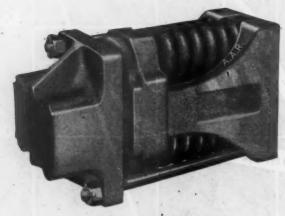
*Few parts, completely automatic, low maintenance cost.

BEFORE you decide your post-war program, investigate the ten year performance record of the Sylphon Control System for heating and air-conditioning . . . installed by some of the largest railroads on more than 600 PASSENGER CARS.

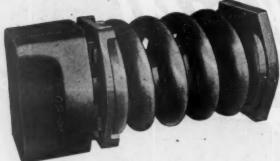
THE FULTON SYLPHON COMPANY

TRANSPORTATION CONTROLS DIVISION DREXEL BUILDING • PHILADELPHIA 6, PA.

Car&LadingProtection



Type M-17-A-223/8" long A.A.R. Approved



Type M-50-B—201/8" long A.A.R. Approved



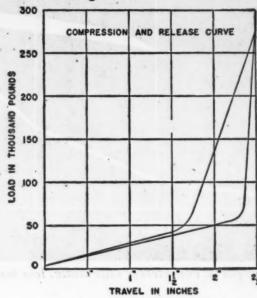
NATIONAL K-4 DRAFT GEAR
Designed especially to meet the requirements of high speed passenger service.

Heavier loads, longer trains and higher speeds make new demands on every item of freight car equipment.

Draft gears especially must be able to stand terrific punishment if they are to provide proper protection to the car and its contents.

NATIONAL FRICTION DRAFT GEARS

made of Naco Steel are designed to meet these extreme conditions. Their smooth action and high ultimate capacity affords the greatest protection to the car and lading.



Closure chart for Type K-4 Gears

Specify NATIONAL Draft Gears for efficient, economical service.

NATIONAL MALLEABLE AND STEEL CASTINGS CO.

General Offices: CLEVELAND, OHIO

Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco. Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, III.

Cushioned movement reduces wear



CRECO

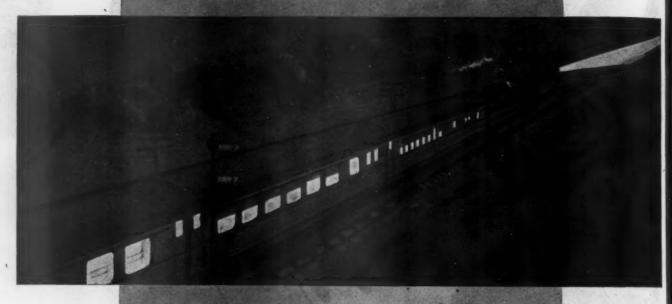
Creco Brake Beam Supports hold brake rigging in alignment . . . brake heads are maintained concentric with the wheel . . . hangers and levers are protected against vibration and wear.

The resilient supporting arms upon which the brake beams ride not only absorb vibration and shock . . . they also prevent the beam from falling.

CHICAGO RAILWAY EQUIPMENT CO.

McCormick Building, Chicago

TRAIN LIGHTING



for CAR LIGHTING
and HEADLIGHTING
See Electric Service

DESIGNERS,
ILLUMINATION ENGINEERS
and MANUFACTURERS

ELECTRIC SERVICE MANUFACTURING CO.

Main Office and Laboratories

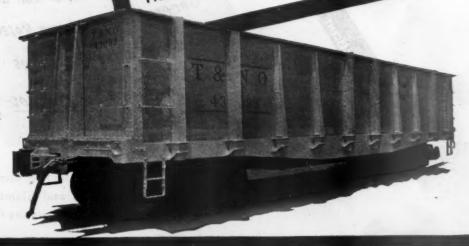
17th. & CAMBRIA STREETS . PHILADELPHIA 32 . PA. . Branches in Principal Cities

ERES THE INSIDE STORY

For more than seven years this gondola car of the Texas and New Orleans Railroad has been used principally for transporting raw sulfur. Floor, sides and ends, made of Alcoa Aluminum, are in excellent condition today. Alcoa engineers are at your service

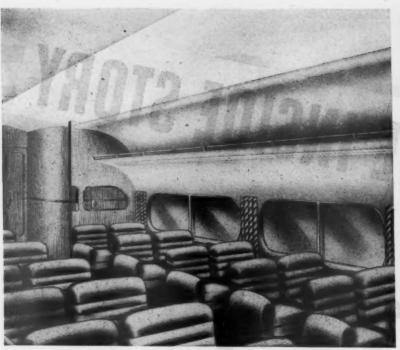
to help you get the full advantages of aluminum in railroad service.

ALUMINUM COMPANY OF AMERICA 1929 Gulf Building, Pittsburgh 19, Penna.



ALCOA ALUMINUM





See bow G-E lamps can help you create modern cars for postwar business. For example, G-E Slimline lamps can readily be concealed in coves and baggage racks to step up lighting levels, increase passenger comfort, help to attract travel.

Good lamps are the heart of good lighting

FILAMENT

The Constant aim of General Electric Lamp Research is to make G-E Lamps

Ty Brighter Longor

For tomorrow, G-E Slimline lamps will join with G-E fluorescent and filament lamps to bring you new help, greater service from lighting.

GE MAZDA LAMPS

GENERAL



ELECTRIC

Hear the G-E radio programs: "The G-E All-Girl Orchestra," Sunday 10:00 p. m. EWT, NBC; "The World Today" news, Monday through Friday 6:45 p. m. EWT, CBS.

"The G-E Houseparty," Monday through Friday 4:00 p. m. EWT, CBS.

BUY WAR DONDS AND HOLD THEM

MILLION MILES AGO!

Twenty-five million miles ago—or eleven years in terms of time—the first Burlington Zephyr streamlined train was placed in service with every journal box of the power unit and cars equipped with Timken Tapered Roller Bearings.

Since that time 13 other Zephyrs have gone into service and together these 14 trains have rolled up a total of 25 million miles!

The following account of the performance of the Pioneer Zephyr is quoted from the 91st Annual Report of the Burlington Route for 1944.

"Perhaps the most important pre-service demonstration made with the train was the Dawn-to-Dusk nonstop run from Denver to Chicago on May 26, 1934. The distance of 1015.4 miles was covered in 13 hours 5 minutes, an average of 77.6 miles an hour. This demonstration of sustained running at high speed was the precursor of overnight service every night between Chicago and Denver, and reduced the shortest schedule from 25 hours 15 minutes to 15 hours 38 minutes. Many similar schedule reductions have followed all over the country."

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

EVERY AXLE JOURNAL BOX
on the New
BURLINGTON "ZEPHYR" TRAIN



The above advertisement appeared in Railway Age, April 14th, 1934.

TRADE-MARK REG U S PAT OFF
RAILWAY ROLLER BEARINGS



FOR RAILWAY FLUORESCENT LIGHTING

VIBRATOR POWER SUPPLY IS A MUST

E-L Vibrator Power Supplies are the most efficient, reliable and economical power conversion equipment to provide modern fluorescent lighting and two-way radio operation on all railroad trains. Fluorescent lighting will be the preferred illumination in the new or converted lounge, dining and coach cars because tests and surveys have shown that passengers definitely want this more efficient type of lighting.

To the railroad operator, this means not only increased passenger satisfaction, but also greater lighting efficiency and economy because fluorescent lamps provide twice as much light as incandescent lamps of equivalent wattage.

Vibrator Power Supply units are also available to give you any necessary voltage for the operation of radio-telephone installations, electric razors and standard broadcast receivers.

SPECIALLY DEVELOPED POWER CONVERSION SYSTEM-To make possible, fluorescent lighting in railroads. Electronic Laboratories has developed a compact, lightweight power conversion system, which permits the operation of ten 42" "slim-line" fluorescent lamps (two circuits of

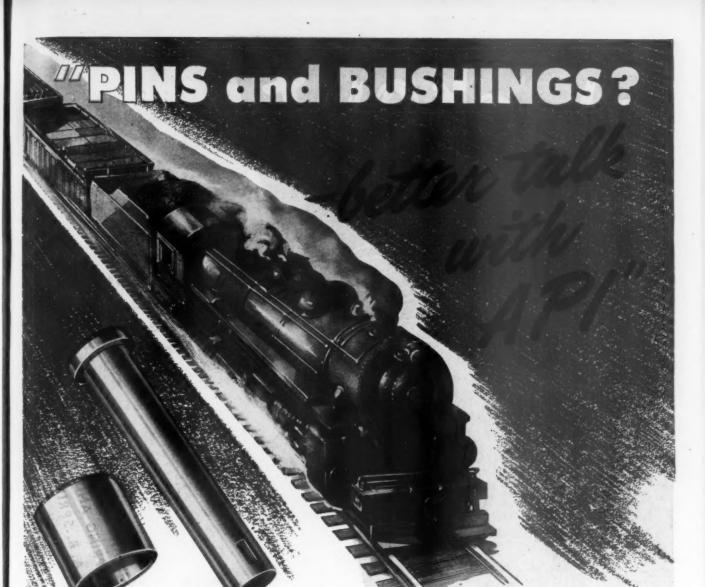
5 each) from 32 volts DC or any other input voltages desired. Multiple units may be used for larger numbers of lights. It provides over 30 lumens of light per input watt. This system incorporates dual series circuits, and the simplicity of series wiring. At the same time, however, it allows individual lamp control through an arrangement for short circuiting any desired lamp in the series string. The system auto-matically adjusts to the new load. A constant level of light is assured, regardless of input variations, because the unit is current regulated.

> E-L Power Conversion Units have been thoroughly proven in actual installations to be highly efficient and to require a minimum of maintenance.

E-L FLUORESCENT POWER SUPPLY . MODEL 2026-This model (shown above) operates ten 42" "slim-line" fluorescent lamps. Available for the following input voltages: 12, 24, 32, 64, 110 or 600 volts DC. Provides instantaneous starting and high efficiency. Dimensions: 14% x 13 x 8 inches.



VIBRATOR POWER SUPPLIES FOR LIGHTING, COMMUNICATIONS, ELECTRIC MOTOR OPERATION . ELECTRIC, ELECTRONIC AND OTHER EQUIPMENT



HERE'S WHY: In railroad pins and bushings, whether it is original installation or maintenance replacement, not only first cost but wear life are always determining factors. To this end, there's no substitute for experience, and equipment. We're geared for long, fast runs on hardened and ground precision parts. A list of machine tool equipment second to none in the industry... from automatic screw machines right down the line... including grinding, heat treat, threading, drilling... and inspection apparatus modern-to-the-minute. Perhaps you have a pin-and-bushing problem? Write our Executive Sales Offices now... for the right answers, fast!



JOB FOR AERONAUTICAL PRODUCTS"

AERONAUTICAL PRODUCTS, INC.

Detroit Plant and Administrative Offices: Detroit 12, Michigan Ohio Plant: Washington Court House, Ohio

Blackout THIS CONDITION!

This is what Vibration and Recoil Curves prove about the movement of your spring groups in



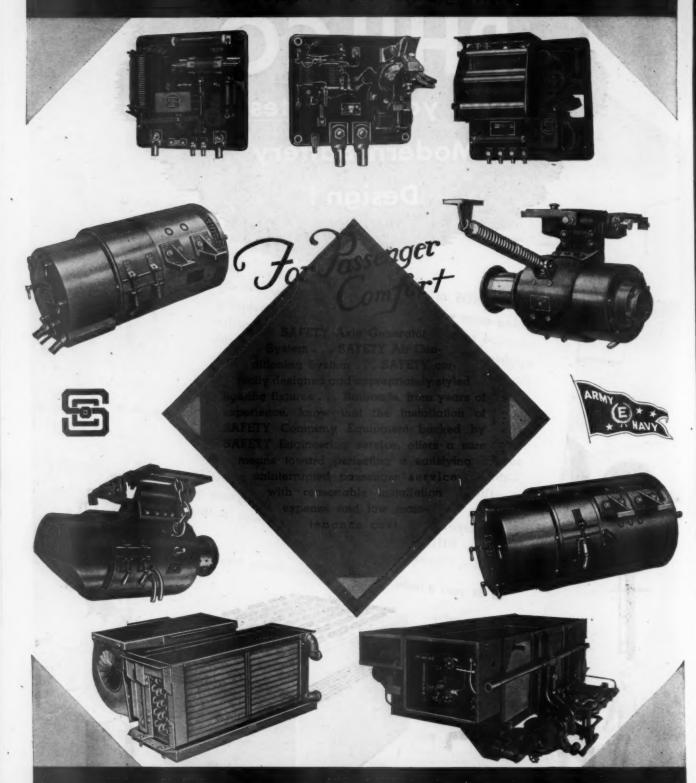
Style A-6-A Holland Volute Snubber Springs

HULLAND

2 SOUTH MICHIGAN AVENUE, CHICAGO, ILLINOIS



LIGHTING AND AIR CONDITIONING EQUIPMENT FOR RAILWAY SERVICE



THE SAFETY CAR HEATING AND LIGHTING COMPANY, INC.

NEW YORK • CHICAGO

PHILADELPHIA

BOSTON

with mus caus

ST. LOUIS

SAN FRANCISCO •

MONTREAL



Relieves Load on Air Conditioning and Heating Equipment.



Excellent Acoustical Value—Reduces Noise.



Laughs at Father Time.



Fireproof-An Invaluable Safety Measure.



Extremely Light in Weight.



Glass Fibers Will Not Rot, Support Fungus Growth or Vermin, Do Not Absorb Moisture,

Fiberglas*

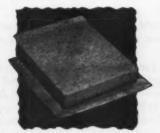
.. GIVES YOU ALL THESE SUPERIOR ADVANTAGES PLUS!

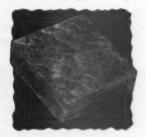
Peacetime rail transportation will provide new heights in comfort to successfully meet the competition of other means of modern travel. Likewise, the shipment of perishable foodstuffs will be stepped up and refrigerator cars will be taxed with more and longer period food preservation. Tank cars must protect chemical and other liquid lading from damage caused by temperature variations.

Of major importance to designing such cars are perfected insulating materials. Recent advances in techniques and fabrications place Fiberglas Insulation further out in front as the answer to controlled temperature, comfort, cleanliness, and quietness... with minimum weight!

Fiberglas is available to builders of Railroad, Passenger, Refrigerator and Tank Cars. Specify Fiberglas for your cars... write for complete information.







Fiberglas is sold to Railroads and Car Builders exclusively by



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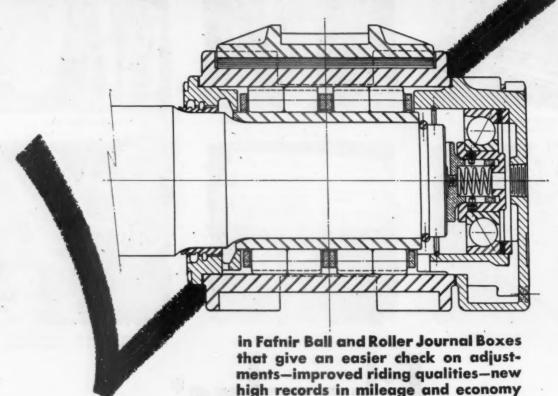
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Note These New Features



- Keeping in mind the 2,000,000 mile service records and the low cost maintenance figures already set up by Fafnir Ball and Roller Journal Bearings—check up on the service you can expect from these additional features incorporated in the new model Fafnirs!
- Spring loaded thrust assembly is in constant contact with the end of the axle thereby eliminating thrust bushing wear and putting pure thrust load on anti-friction bearing.
- No increase in lateral clearance due to bushing wear with decrease in operating temperatures.
- Conveniently located pipe plug can be removed to simplify checking of lateral clearance, eliminating the necessity of removing entire cover.
- Same lateral clearance as maintained in other types of Fafnir Journal Bexes to assure easier riding qualities and to reduce shock impact.
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FAFNIR BALL & ROLLER JOURNAL BEARINGS

REDUCE STARTING LOADS UP TO 90% . . . CUT MAINTENANCE COSTS TWO-THIRDS



THE PENNSYLVANIA RAILROAD



uses the SPICER Positive Generator Drive

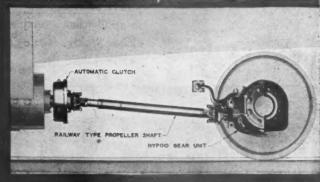
• The Pennsylvania's South Wind is another of the famous American trains using Spicer Generator Drives for delivering steady, dependable generator power to lighting, air conditioning, refrigeration and other equipment. There are more than 2,000 of these reliable Spicer Drives in use by 27 different railroads throughout the country.

The modernization of existing cars, and the development of new cars incorporating high standards of passenger comfort, will require increased and more dependable electrical power to satisfactorily operate with expanded use of air conditioning, improved lighting, electro-mechanical water coolers, radio, electric kitchen equipment, etc., and other improvements still to come. Cars will operate generally at higher speeds and will be much quieter and smoother. All of these are factors emphasizing the importance of using a reliable generator drive.

The simple means of applying the Spicer Drive makes it readily adaptable to both old and new cars with

few, if any, changes necessary in the car, truck or axle construction.

Other Spicer features include high efficiency and economy, safety, quietness and smoothness. Write for full details and literature describing all the profitable advantages Spicer Positive Generator Drives make available to you.



Exterior and cross-section view of Spicer Positive Generator Drive

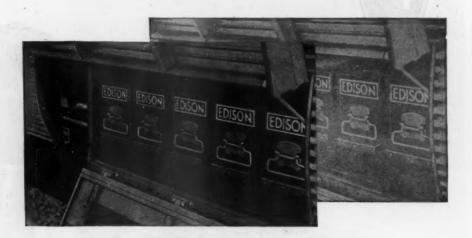


cer Positive Generator Drive

Manufactured, Sold and Serviced by Spicer Manufacturing Corporation, Toledo, Ohio

SO DEPENDABLE THEY GIVE A

CACHELAS AN SECOND LIFE



Electrically operated luxuries and conveniences on post-war cars will certainly be a major factor in attracting patronage and providing utmost passenger comfort — especially if they are backed up by an adequate standby power supply of highest dependability. You get this kind of power insurance—and save weight too — when cars are equipped with Edison Alkaline Batteries.

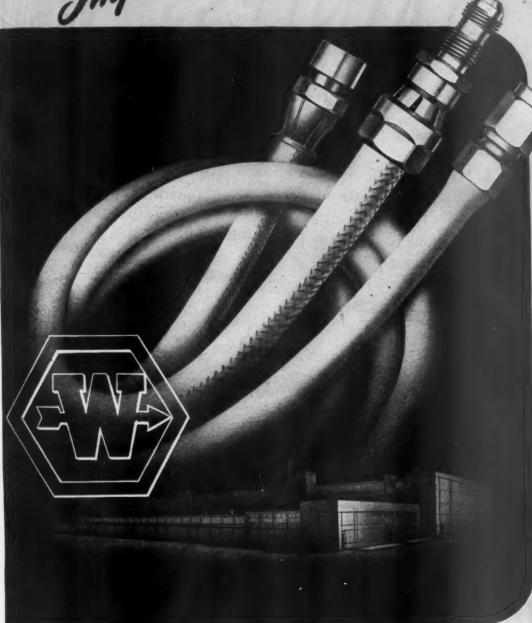
Their unequaled dependability in railway-car service is indicated by the fact that a number of railroads are getting a "second life" from their alkaline batteries. After delivering normal service life in 32-volt, 64-volt or 110-volt systems on passenger cars, the batteries are often regrouped and installed on baggage, express or other cars, and even in stationary services, having lighter load demands. In these "new" applications, they give additional years of unfailing service. Thus, in effect, the railroads get new batteries free. The fact that this is possible demonstrates that alkaline batteries remain dependable power units beyond their normal service life. This is a good point to bear in mind when selecting batteries for present or future passenger equipment. Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, N. J.





Light-weight cars call for light-weight electrical equipment. Alkaline batteries save weight where it counts most — near the middle of the car. The larger the kw-hr. capacity, the greater the weight that is saved by using alkaline batteries.

Improved.



In addition to industrial hose, Weather-head plants make all types of fittings, valves, hydraulic cylinders and other parts for these industries:

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REFRIGERATION

RAILROAD

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ROAD

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THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO Plants: Cleveland, Columbia City, Ind., Los Angeles Canada - St. Thomas, Ontario

New uses are being found daily for the application of our improved industrial hose lines on machinery of all kinds. We manufacture hose assemblies of all types to withstand pressures up to 10,000 P.S.I. They can be equipped with either permanent crimped ends or with re-usable, quickattachable hose ends. For information or literature write or phone any Weatherhead branch office.

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Most versatile of modern metals...their unique combinations of properties merit your consideration in designing for the future.



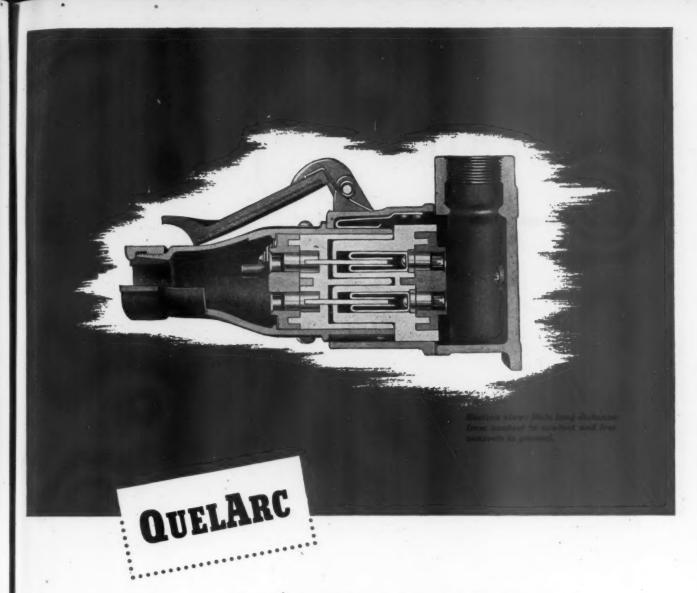
 This Streamliner exemplifies the enduring strength and beauty of stainless steel.
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International Nickel are miners, smelters and refiners of Nickel, an important ingredient of the stainless steels, but do not produce stainless steels. If interested, please communicate with established sources of supply for stainless steels.

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RAILWAY MECHANICAL ENGINEER



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Pyle-National plugs and receptacles are built to stand up in railroad service, delivering dependable service with minimum maintenance. The exclusive QuelArc construction provides exceptional protection to contacts, for safe use as current rupturing devices. In the section view, note the complete enclosure of all contacts in insulating chambers which form an arc-trapping space. Note also the long distances from contact to contact and from contacts to ground. Contacts are individually renewable. Full ground protection is provided.

QuelArc plugs and receptacles are available in a complete range of styles, 2, 3, 4 wire types; ratings 20, 30, 60, 100, and 200 amperes. Many other types

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Compare this "short-cut" with your present method, and plan now to get aboard the P-K savings special!



SIDETRACK NEEDLESS TAPPING, slow nut running and awkward riveting by using P-K Self-tapping Screws wherever possible . . . get your bad-order cars back carrying pay loads sooner. Schedule-crowded shops report savings up to 50% in time and labor on many jobs.

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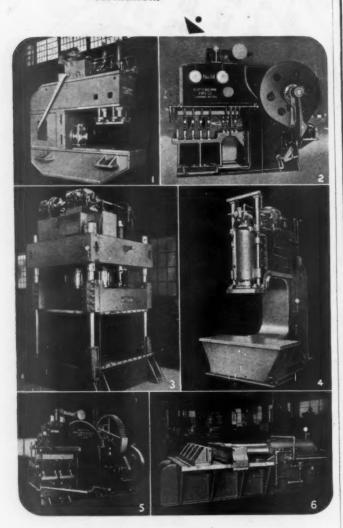
PARKER-KALON
Quality-Controlled
SELF-TAPPING SCREWS

FOR EVERY METAL AND PLASTIC ASSEMBLY

HEX HEAD

METAL WORKING MACHINERY

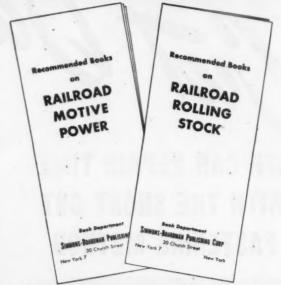
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Your copy of the Wilson Tube Cleaners Check-List will be sent on request—and without obligation, of course.



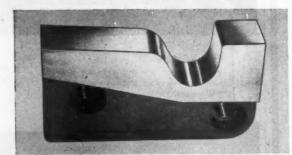
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For Diesel and Electric Locomotives

The Viloco Sander equipment for Diesel and Electric Locomotives is especially designed for this type of service. It is economical in the use of sand and air; reliable and efficient under all weather conditions.

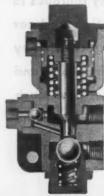
Viloco Sander Trap Type GB-342

The Type GB-342 is made with a horizontal discharge as illustrated above, and is provided with a clean-out nozzle. The sander nozzle which controls delivery of sand is fixed and cannot be altered promiscuously. Any alteration in delivery requirements is simplified by applying a longer or shorter nozzle. A check valve with composition gasket prevents back pressure from blowing sand into the air line. If the installation requires angle discharge the Type GA-343 trap should be specified.

Viloco Sander Valve No. 350

The Operating Valve is compact and simple in construction. Its small size permits location within easy reach of the engine men. This valve is connected to operating cylinder of

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Viloco Relay Valve No. 341
The Viloco No. 341 Relay Valve is constructed to provide a cleanout blast, of a predetermined interval, before and after each sanding operation. A more efficient clean-out is obtained through the use of a ball check arrangement. This new feature prevents delivery of sand while clean-out air is flowing, thus overcoming excessive cutting of traps and piping, and at the same time conserving the sand supply.

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REX-TUBE (RT-15)—is strong and wellconstructed to take years of wear and ear. Made from heavy strip, steel or proze, Interlocked design, with inner packing of high-grade asbestos.

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Plants: Maywood and Elgin, III.



eady 1 10 SECONDS to thread 1" to 2" pipe

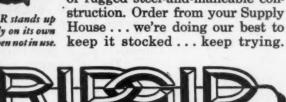
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RIBRID No. 65 R



No. 65 R stands up bandily on its own feet when not in use.

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EP = Effective Packing Element

P/V = Pressure or Vacuum

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Perfect flexibility with low torque is assured in every CHIKSAN Ball-Bearing Swivel. Yet Chiksan design and construction are so sound they can be expressed in a simple formula. There is nothing to tighten or adjust . . . no stuffing boxes to put the brakes on easy turning and thus produce excessive strains on pipe lines and fittings. Smooth, easy turning throughout 360° is provided in one, two and three planes. Packing Element is so effective the same Swivel may be used for either pressure or vacuum service . . . for loading or unloading. Chiksan Ball-Bearing Swivels are built for pressures to 3,000 p.s.i. and varying temperatures. Write for latest catalog.



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- 4. Vapor Proof Type C Extension
- 5. Vapor Proof Lamp with Reflector and Guard
- 6. Molded Lamp Socket with Water Proof Switch
- 7. Molded Detachable Socket with Water Proof
 Switch
- 8. String-A-Lite Molded Socket EHS

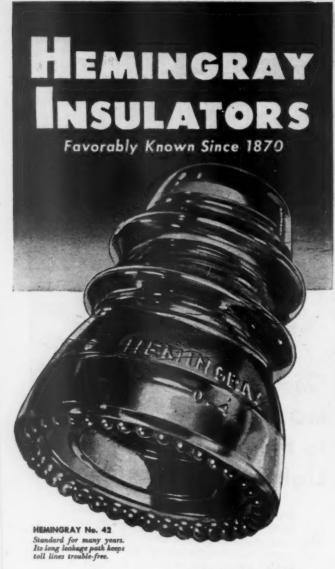
They may be made up in assemblies with cable and connectors or may be had on leads for splicing to your cables.

Combinations of types may be factory assembled on a cable length with end connectors forming String-A-Lite, a portable multiple lighting assembly.

Write for details of available types to meet your requirements.

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Hemingrays are sold by principal jobbers and are manufactured by Owens-Illinois, Hemingray Division, Muncie, Indiana.





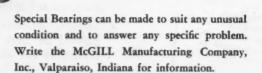


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5 Points of Superiority in Baker Valve Gears

The new Baker Valve Gear has five points where McGlLL MULTI-ROL Bearings may be applied. Thus great savings in maintenance plus large increases in mileage are effected. Baker Valve Gears and McGILL MULTIROL Bearings make a record-breaking team. 500,000 miles and more without attention is not unusual.



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UNIVERSAL BORING MACHINE FEATURES INSURE PRODUCTIVE CAPACITY AND ACCURACY

Railway construction and maintenance shops will find the UNI-VERSAL BORING MACHINE a welcome addition, because of its versatility in precision machining operations.

This improved UNIVERSAL BORING MACHINE is available in 4" and 5" spindle sizes. Both are readily adaptable to do many boring, milling, turning, facing, recessing, and threading operations.

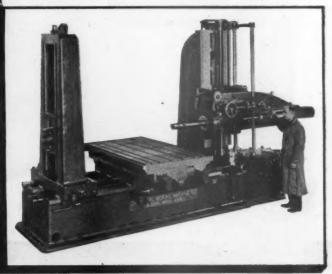
And UNIVERSAL can also show you how to handle many more precision jobs on a UNIVERSAL HORIZONTAL BORING MA-CHINE with the Tri-Way bed.

Write today for complete information.

Milling Diesel Engine Frame for Switching Locomotive.



ING MACHINE COMPANY HUDSON, MASS., U. S. A.



SPEED-UP Application of Valve and



Regarding the McQuade Bushing Applicator. Regarding the McQuage bushing Applicator, the chief mechanical officer of a large railroad says: "We have been using the McQuade for says: "We have been using the mcQuade for says." says: "We have been using the McQuade tor over a year in one of our roundhouses with an unusual saving in time. Bushings can be inserted in 15 to 20 minutes as compared to 3 to 4 hours insertion by the old hand method."

Other McQuade Products: Cylinder Seat Surface Grinder Electric Tool Post Grinder

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- 15 to 20 minutes application time for cylinder bushings and for BOTH valve bushings simultaneously.
- Eliminates need for heating cylinders or use of power wrench.
- Pressure gage on pump accurately measures pressure used in applying bushings.
- Equally efficient in application of side rod bushings and driving box brasses.
- Smooth, efficient performance widely acclaimed on large roads and small by shop executives and mechanics alike.

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1. It automatically drills and reams groups of four small holes, and at the same time finish bores and chamfers a larger hole located at the centre of each 2. Complete automatic electric control renders skill on operator's part unnecessary.

by other kinds of metal parts.

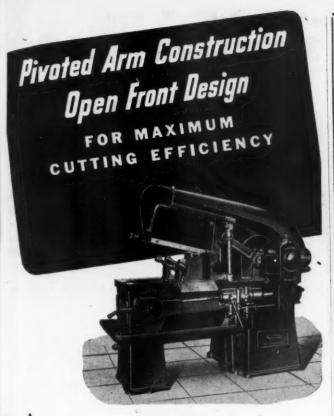
The Moline M32 Special Drilling, Boring and Reaming Machine shown here is one of several designs of completely automatic machines for work on aircraft gun turret rings, but it has many features which are applicable to machining problems presented

3. The work is indexed, during the cycle, automatically by hydraulic power.

4. Complete safety interlocbing of electrical, mechanical and hydraulic functions prevents production troubles.

5. A machine of this type, made to your own specifications, can save you many times its first cost, resulting, too, in a reduction in the unit cost of parts produced.

The complete data on this machine will be well worth your looking into. Send for it today.



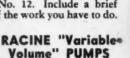
ALL RACINE Metal Cutting Machines employ "Pivoted Arm Construction and Open Front Design" combined with "Straight Line Pull on the Connecting Rod." Nearly forty years of research and manufacturing experience prove these principles correct.

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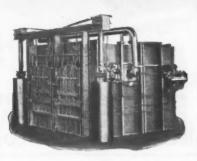
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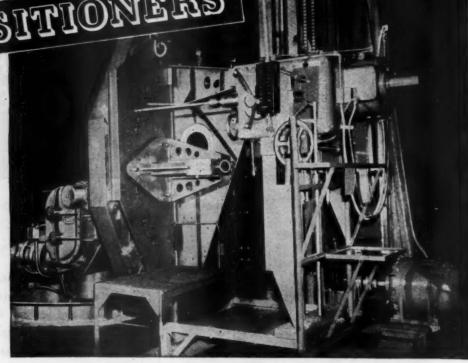
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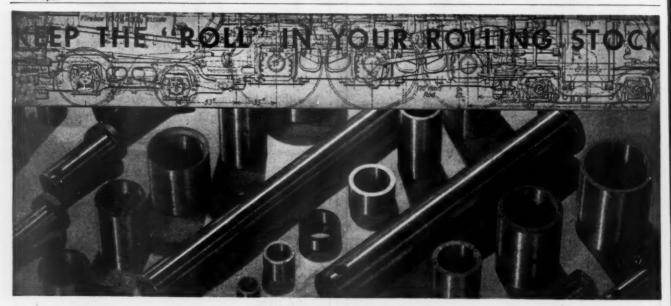




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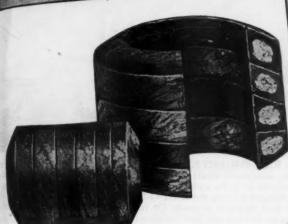
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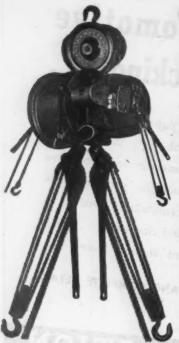


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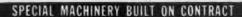
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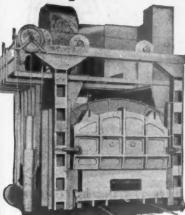
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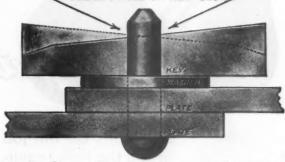
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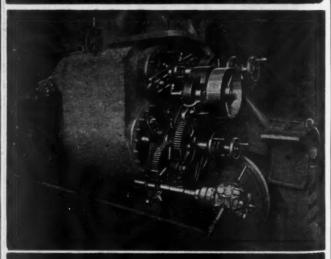


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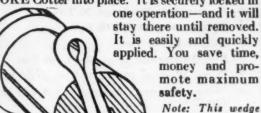
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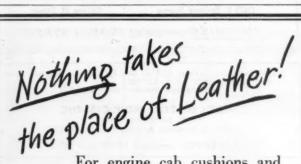


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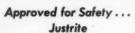
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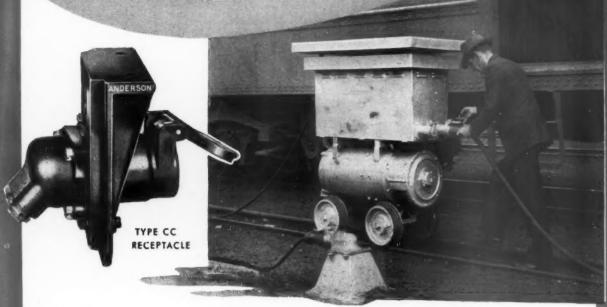


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